NOVEMBER
1955

A TRANSMITTER WITH LOW HARMONIC OUTPUT
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WI BROADCASTS

All Amateurs are urged to keep these frequencies clear during, and for a period of 15 minutes after, the official Broadcasts.

VK2WI: Sundays, 1100 hours EST, 7146 Kc. and 2000 hours EST 50 and 144 Mc. No frequency checks available from VK2WI. Intrastate working frequency, 7135 Kc.

VK3WI: Sundays, 1130 hours EST, simultaneously on 3573 and 7146 Kc., 51.016 and 146.25 Mc. Intrastate working frequency 7135 Kc. Individual frequency checks of Amateur Stations given when VK3WI is on the air.

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VK9WI: Sundays, 1000 hours EST, simultaneously on 3.5, 7, 14 and 144 Mc. Individual frequency checks of Amateur Stations given when VK9WI is on the air.

AMATEUR RADIO

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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GUEST EDITORIAL

★

"Nation Shall Speak Peace Unto Nation"

runs the inscription over the portals of the B.B.C. Headquarters in London.

It was with mixed feelings that one listened to sundry broadcasts on the "Big Four" "pow-pow" at Geneva. At that slightly sinister gathering of individuals in whose hands the very existence of civilisation balanced precariously, the result was hailed by newcasters far and wide, to the effect that the "future outlook for negotiations in less brittle!"

Memory surges back to Munich, with hopes of "peace in our time," and the ranting fulminations from Zeesen by one in whose hands the peace then lay. It is difficult to believe that today, those on one side of the fence are contemplating the other in benignity for h.f. radio channels indicate otherwise.

The state of affairs in most of our 40 metre allocation is ironical. In view of the aura of goodwill displayed at Geneva, perhaps one may be pardoned for wondering why those saw-tooth oscillators driving megawatts of pulsed power have been, and still are, weaving their belligerent pattern?

For years now the "cold war" has included this radio version, with the skipping about of "QRM factories," whilst the B.B.C., and others, try to dodge by frequency "cuddling." This goes on in the s.w.l. 31, 25 and 19 metre bands, but probably with severest intensity in our 150 Kc. of "40." From 7100 Kc. higher, is torn to shreds by juggernauts with no heed for Amateur Radio.

If leaders of nations in this world are sincere about goodwill, effective procedure would be to ensure unhampered inter-communication between youth of all nations. It should be a top priority.

The present restricted frequency snippets in the useful DX regions should be superseded by far more generous allocations. Amateur Radio should be given scope to spread its beneficial influence throughout the younger generations, with bands wide enough to permit congestion-free DX working. Is it too much to hope that there may yet arise statesmen with enough foresight and courage to realise that non-commercial communication between individuals by the medium of Amateur Radio can be a potent factor for future international understanding and the effective removal of man-made barriers?

—D. B. KNOCK, VK3 Division.

THE CONTENTS

A Transmitter With Low Harmonic Output

PART TWO

BY HANS RUCKERT,* VK2AOU

POWER AMPLIFIER STAGE

Fig. 3: The plate circuit of the driver valve and the grid circuit of the p.a. are equipped with multiband tank circuits which are ideal for this purpose. No bulky coil switching is required. A simple small split-stator variable capacitor of 2 x 100 pF. and two fixed coils are all that is needed to cover the range from 3.2 to 34 Mc.

When adjusting the coils of these tanks it is important to make sure that the 3.5 and 14 Mc. and the 7 and 28 Mc. settings of the variable capacitor are **not** the same. If they are, the stage may not only amplify the lower frequency, but may also act as a frequency multiplier, upsetting the purpose of the stage. This test can be easily carried out with a grid dip meter.

Two link lines with coax cable are needed, one for the small coils and one for the two big coils. The highest voltage is always at the spot where the two coils meet (hot end), but the inductive coupling has to be done with two links. The 3.5 and 7 Mc. band uses the big coil (30 turns), whilst 14, 21 and 28 Mc. use the small coil (13 turns).

These two multiband tanks can be coupled with the link lines so closely that again a band-filter effect is achieved, permitting a change of oscillator frequency over a certain range without having to retune the driver multiband tanks.

The two Telefunken valves LS50 are all-glass radar pulse valves with about the same ratings as the 807, but they have half the volume. With 100 watts input the valves are not fully loaded, but this is a precaution against overload and damage to the cathodes if by accident the tank should be not properly tuned or the coupling should be too tight.

The regulated grid bias is set to —130v. The screen voltage can be reduced from 250v., normally, to 150v. for tuning purposes. To achieve effective and low distortion modulation, it is necessary to modulate the screen grid as well. This can be easily carried out by putting a small power supply choke (20 hy. at 30 Ma.) in the screen grid lead and by-passing the screen grids only for r.f. with a 1000 pF. capacitor each.

To prevent any self oscillation of the p.a. stage, if the antenna is switched off when receving, the "T or R" relay disconnects the screen supply. No neutralisation was required.

The best parallel feeding choke is still by far the single layer coil of about ¾" diam. and about 60 turns to get 160 uH. This choke represents about 100,000 ohms impedance over the range from 3 to 35 Mc. without showing any resonances in this range. Usually r.f. chokes have far too much inductance and sharp pronounced series and parallel resonances. It is hopeless to use those chokes with different coils in series because you never know if you have 3,000,000 or 3,000 ohms impedance on the different bands. Multilayer coil chokes are very likely to go up in smoke.

Three ceramic high voltage disc capacitors of 250 and 500 pF. are used to couple the pi-tank to the p.a. or to by-pass r.f. behind the two. r.f. chokes. These t.v.-type capacitors are very small and their breakdown voltage is near 30kv. d.c.

The pi-filter is also band-switching. This version of the old Collins filter with its 70 ohm impedance parallel to the output capacitor has several important features: Band-switching is easily done because no coupling coils have to be changed. The 28 Mc. coil is used in place of the lead from the main tuning capacitor to the switch around which the two other coils are arranged. ½" wide silvered copper strips are used as leads to reduce inductance to wire the pi-network. A ganged three wafer switch with heavy spring contacts (five per wafer on the same contact) changes the coils or taps on the coils and connects also different fixed ceramic capacitors parallel to the output variable capacitor. This capacitor is a 500 pF. receiver type because at 70 ohms we are not likely to have a higher r.f. voltage than 100 volts parallel to this capacitor, even with some mismatch.

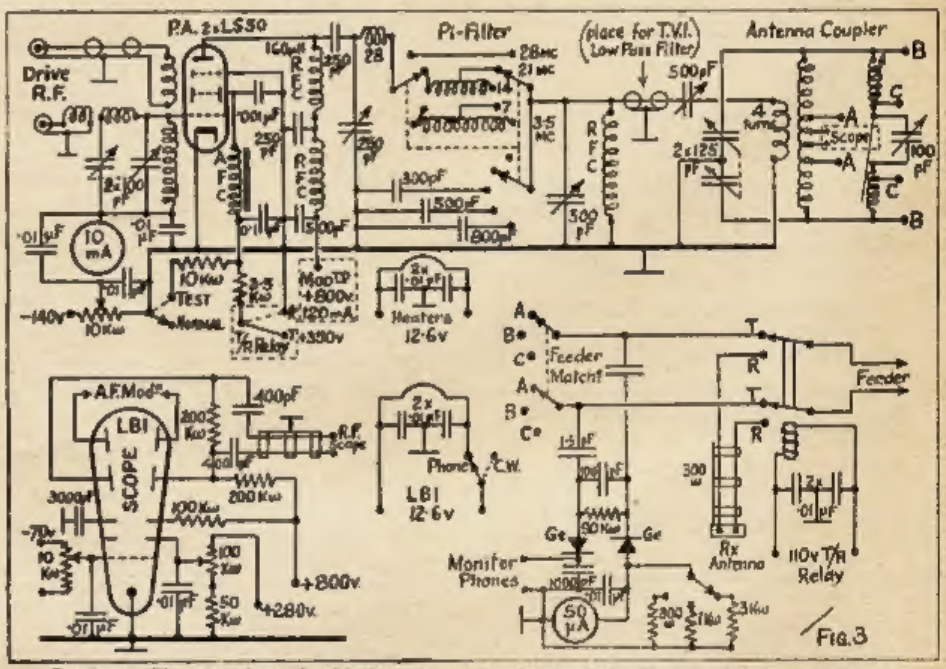
Maximum output from the pi-network is obtained with about 300 pF. output capacity at 28 Mc., 400 pF. at 21 Mc., 550 pF. at 14 Mc., 800 pF. at 7 Mc., and 1,200 pF. at 3.5 Mc. A mismatch in the antenna coupler or feeder of the aerial is certain if very much smaller capacity values are giving better results.

The place for the low-pass filter is only marked on this circuit. The filter has a cut-off frequency of 35 Mc. and high attenuation from 41 Mc. and higher of at least 50 db. to suppress the third harmonic of 14 Mc., the second harmonic of 21 Mc. and also other harmonics which may otherwise get out to the aerial. No measurable losses by inserting the filter have been found and only the coils of the filter did show a very slight increase in temperature whilst the NPO ceramic disc type capacitors remained cold (power factor better than 0.04% on short waves). This filter will be described in all details in a later article.

ANTENNA COUPLER

To feed any feedline from this transmitter with an unsymmetrical p.a. and pi-filter tank, to assist the low-pass filter in suppressing harmonics, and to have a simple means to couple r.f. to the scope for modulation control, an antenna coupler was used. Here again a multiband tank circuit was employed so that no coil changing or switching of turns was required.

The writer did not have the often-used four-gang capacitor for tuning this symmetrical multiband tank, so the split-stator capacitor between the halfs of the small coil was replaced by a single air capacitor using a ceramic extended spindle. For 3.5 to 7 Mc. the hot ends of this tank are the ends of the big coil at "B," here we would have to connect tuned feeders, but 300 or even 70 ohm feeders would be connected closer to the centre of the big coil at "A." The centre of this coil is always r.f. cold, and here we couple the four-turn link, coming from the



Erratum.—The p.a. stage should show two tubes in parallel. The circuit components are designed to operate under these conditions. Each p.a. tube screen is separately by-passed.

*25 Berrille Road, Beverly Hills, N.S.W.

p.a. stage or low-pass filter, via the 500 pF. variable capacitor to the antenna coupler.

This single fixed link is a satisfactory compromise for all bands from 3.5 to 28 Mc. and helps to simplify the matter a great deal. The feeders for the higher frequency bands, like 14 to 28 Mc., have to be put on the two small coils symmetrically. Only the 28 Mc. feeder may be in some cases also placed on the big coil.

The small coils are nearly r.f. cold at their outside ends, but hot at the 100 pF. capacitor "C." The two halves are closely coupled to each other. They are like a single coil with an interruption in the middle. They have to handle all the power at 14 to 28 Mc. and should be wound with heavy wire or tubing.

If the coils of the coupler get hot, then not much power is being transferred to the aerial but is being lost due to mismatch and standing waves. Try different taps.

The writer was using a 130 ft. Zepp antenna for all bands with this coupler and a piece of double co-ax cable 22 ft. long. This cable acted as a quarter wave tuned feeder on 7 Mc., and tuning with the coupler, it works similarly at 3.5 Mc. or any other band up to 30 Mc. The same coupler and piece of double co-ax cable was used as a part of the 70 ohm feeder, extended by 70 ohm twin lead cable, to operate a three element 14 Mc. beam. The shielding of the cable was earthed and helped to prevent the radiation of r.f. from the feeder to other cables and gear in the shack, an important part of the efforts to reduce b.c.i. and t.v.i.

CHECKING MODULATION

It is extremely simple to install a scope to check the modulation. The author would not like to operate a phone transmitter without a scope, because before we can hear distortion and splatter, we are most likely causing trouble to fellow Amateurs.

The scope uses the same power source as the p.a. stage. In this case the deflection plates have to be put on high tension, too. The r.f. deflection plates of the scope (Telefunken type LB1 2½" diameter screen) are coupled via two high voltage ceramic disc type capacitors of 400 pF. and a piece of double co-ax cable to the antenna coupler.

In the receiving position the scope gets a high negative bias so that the screen cannot get burnt.

A section of Fig. 3 shows the circuit of the scope and in another section the output connections with the antenna relay, etc., can be seen. The switch positions A, B or C indicate the different connections the antenna relay can have to the antenna coupler coils, depending on the type of feeder or aerial used. The same aerial is used for the receiver which is connected to the relay via 300 ohm double co-ax cable.

After the thermocouple meters had been burnt out when making tests much earlier, the writer decided to use Ge diodes to measure the r.f. voltage instead of the current. Now two 1.5 pF. bead type ceramic capacitors take a small amount of r.f. to the diodes where one acts as rectifier to feed a headphone to monitor the phone transmission, and the other diode forms the r.f. voltmeter together with a 50 microamp. instrument. This method is just as good and most likely more accurate at 30 Mc. because not many thermocouple ampmeters are correct over a frequency range of more than 1:3.

GENERAL REMARKS

Before concluding the description of the h.f. part of the transmitter, a few more general remarks may be made. The v.f.o., the five frequency multiplier stages, and the driver stage are built on one chassis, using three subchassis, which are arranged in such a way that the v.f.o. and driver are close to the front panel and the multipliers are at the back of the chassis. In the middle are the a.f. stages of the modulator pre-amplifier and the stages of the clipper filter.

The upper chassis carries the p.a. and the antenna coupler, whilst the scope is in the middle and the modulator final is built at the back of the chassis. There are several shielding compartments.

In both chassis all wiring, except certain h.f. leads, is done with shielded wire or co-ax cable. This takes much more time to do, but it pays in the time saved looking for r.f. or a.f. where they should never be. This very important step, together with effective by-passing, using entirely ceramic disc type capacitors, is so necessary to confine r.f. generally, and harmonics especially, to the chassis compartments where they have been generated.

That is why even a very sensitive absorbtion type frequency meter with a Ge diode and 100 microamp. meter will not detect any harmonics at the grid of the driver, the grid circuit is not tuned to. The same applies to the driver plate and p.a. plate circuit.

All capacitors up to 0.05 uF: are ceramic dielectric capacitors. It may have been even better to use 1,000 pF. and not 10,000 pF. by-pass capacitors to work closer to the self-resonance frequency of these by-pass capacitors. These are so small that 30 would not require more space than a cigarette.

It would be of little value to give accurate coil winding data because a different layout, other capacitors or valves would cause too great variations. The multiplier stages use receiver type plastic coil formers where a plastic screw holds a short wave iron slug. These formers are ¼" diameter. The coupling of the band-filter coils has to be made as tight as possible, especially at 3.5 and 7 Mc. as it would have been impossible to achieve enough coupling without the slugs. This would be simpler if a bigger coil diameter is used. These coils have no stray field because they are so small and the slug helps, too, in this regard.

The coils of the three multiband tank circuits and those of the pi-network are at first wound as estimated, using some old wire of a burnt out transformer. Checking with the grid dip meter shows if the turns are right or if the diameter and coil length have to be changed. When the proper coil dimensions are found, which does not take long with a calibrated grid dip meter, the right wire gauge or copper tubing may be used. In this way all stages can be aligned without switching the transmitter on.

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A V.H.F. AUTOMATIC TUNER

BY DR. H. A. F. ROFE,* VK2HE

ONE wet Saturday afternoon, I was working on some gear in the shack with the 2 metre receiver running, prepared to talk to anyone who came up on the band, but unwilling to devote more than a few scant seconds in every five minutes to tune the receiver. By tea time I had heard and worked no one. The following week I was talking to a local fellow who said, "I called CQ several times last Saturday afternoon and could not get a contact."

On another afternoon last summer, I tuned over a quiet 6 metre band for that elusive DX at 1630 hours, then engaged in a minor task which was completed at 1646 hours. An inspired hunch prompted me to look over the band before leaving the shack. Three hours and many contacts later, after the last signal had disappeared, I retired happily to a belated evening meal. How about an automatic tuner that would draw attention to itself, like the telephone, when a signal came up?

A forward-reading v.t.v.m. type S meter using a 0-1 Ma. movement can be adjusted to give f.s.d. on an S7 to S9 signal with considerably less than a half scale reading on local noise. Could not this 1 Ma. be used to operate a relay, which, in turn, would control an electric motor and, if desired, a warning device?

Out of the junk box came a slow speed motor, a continuously-rotatable three-gang condenser and a very sensitive relay, and around these essential components was built a receiver tuning from 4 to 6 Mc.

The motor is made by a well known firm of electric clock manufacturers and designed to operate a slowly revolving demonstration turntable. This one has a speed of one revolution per five seconds and operates from 240v. a.c.

The gang condenser came out of unidentified v.h.f. gear and has a maximum capacitance of about 100 pF., ideally suited to the LC ratio of each tuned circuit for which special coils were wound to cover exactly 2 megacycles.

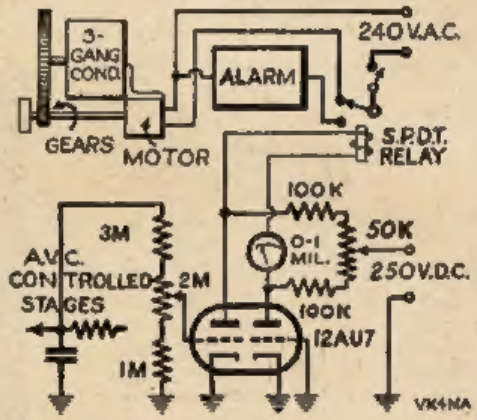
The relay derives from the readily obtainable BC357L and can be adjusted to operate over a wide current range from 50 microamperes to about 2 milliamperes. Its field coil has a resistance of 10,000 ohms, and, as its s.p.d.t. contacts will handle up to 10 amperes, they will easily cope with the few mils. drawn by the motor at 240v. a.c. No sparking suppression has been found necessary and the motor causes no electrical interference on the bands used.

The receiver itself is conventional average Amateur design with an r.f. stage, converter, an i.f. stage at 455 Kc., 2nd detector, a.v.c. and noise limiter, p.a., and provision for Q multiplier, b.f.o., a gated-beam n.b.f.m. discriminator and a 6 metre front end.

Referring to the circuit diagram, it will be seen that the relay field coil replaces the usual 10,000 ohms resistor in series with the 0-1 Ma. meter. The relay is adjusted to operate at 0.75 Ma. A component in the balanced-bridge circuit, the 50,000 ohm potentiometer, is used to adjust the meter needle to zero. The 2 megohm pot. is related to the 6 megohm bleeder resistance across the a.v.c. line according to the sensitivity of the meter used and to the a.v.c. voltage available. It is the sensitivity control and is adjusted so that the highest prevailing noise peaks will not stop the motor.

The motor is geared to the gang condenser to give it a speed of one revolution per 25 seconds, during which time two megacycles are scanned twice. It can be switched off for manual tuning.

The operation of the device is very smooth on the 2 metre band and at maximum usable sensitivity, that is, when the relay is just insensitive to noise, even a 5 and 7 signal will be tuned in.



The alarm could be a buzzer, bell, siren or what have you.

A fascinating application, suited to the lazy "mail reader," is when two fairly strong stations, in contact, are the sole occupants of the band. When the sensitivity control is set at the minimum level required for the weaker signal to operate the relay, the whole QSO is heard without stirring from the couch until both stations QRT. The tuner then proceeds with its job of scanning the band.

As the receiver is used in conjunction with a crystal-locked 2 metre converter, a few relevant comments would seem appropriate.

The Jones or "Shure Fire" fundamental oscillator is used with a 7.7778 Mc. crystal and a 6J6, first triode tripling and second triode section doubling. A second 6J6 is tripler and mixer. A series cascode 6BQ7 is inductively coupled to a 6AK5 r.f. stage, which is inductively coupled to the mixer.

The converter has its own power supply and is completely isolated from the h.f. receiver, except for the co-ax input lead. These precautions have completely eliminated "birdies" and "breakthrough" of commercials.

For 6 metre a 7.6667 Mc. crystal, multiplied six times, would bring 50 Mc. in at approximately 4 Mc. Better still, if the tuner were designed to operate from 3 to 5 Mc., a 7.833 Mc. crystal, multiplied six times for 6 metres, and 18 times for 2 metres, would bring both 50 Mc. and 144 Mc. in at 3.002 Mc. and 3.006 Mc. respectively, the first 6J6 being used for both bands.

If we wish to combine 5 metres and 2 metres at some future date, the problem is easily solved from the equation:—

$$56 - XY = 144 - XZ$$

where X = fundamental crystal frequency.
Y = total crystal oscillator multiplication factor for 5 metres (6, a multiplier of 18, is convenient).
Z = total crystal oscillator multiplication factor for 2 metres (18 is selected),

hence $56 - 6X = 144 - 18X$

therefore $X = 7.3333$ Mc.

To find where 56 Mc. will appear in the h.f. spectrum:—

I.F. = sig. freq. — osc. freq.
= $56 - 6 \times 7.3333$
= 12.0002 Mc.

Checking on 144 Mc.:—
I.F. = $144 - 18 \times 7.3333$
= 12.0006 Mc.

Therefore our h.f. receiver will be required to tune from 12 Mc. to 14 or 16 Mc. to cover 2 or 4 Mc. of the 5 or 2 metre bands.

For those, who are not yet prepared to build a crystal locked converter, or prefer a generally simpler design, the electric motor could be coupled to the small split-stator condenser of a tunable oscillator for either band.

* 16 Stanhope Road, Killara, Sydney, N.S.W.

A.O.C.P. CLASS

The Victorian Division A.O.C.P. Class will commence on Thursday, 17th November, 1955. Theory is held on Monday evenings, and Morse and Regulations on Thursday evenings from 8 to 10 p.m. Persons desirous of being enrolled should communicate with the Secretary W.I.A., Victorian Division, 191 Queen Street, Melbourne (Phone FJ 6997 from 10 a.m. to 4 p.m.), or the Class Manager on either of the above evenings.

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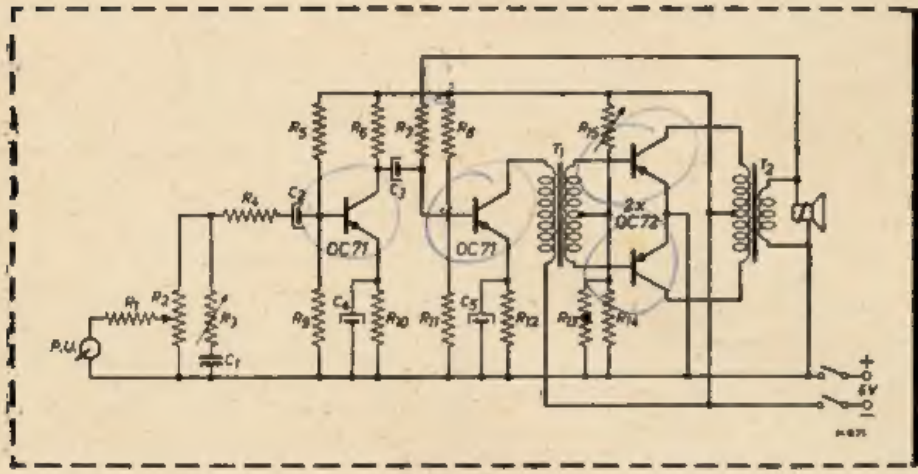

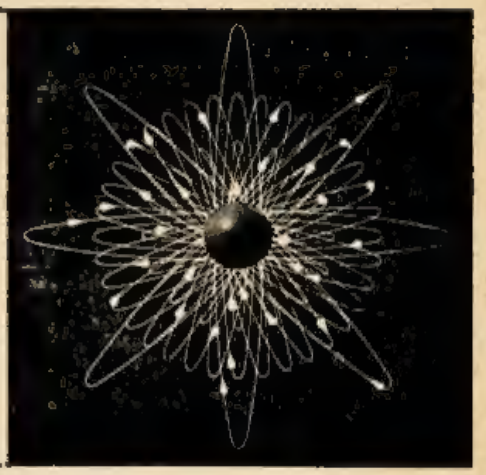

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Lightning Protection for the Transmitting Antenna*

BY R. C. CORDERMAN, W4ZG

• Lightning protection for the Amateur transmitting antenna, especially when open-wire feeders are used, has been largely neglected. W4ZG points out the dangers involved and offers some simple solutions.

AN old adage says lightning never strikes twice in the same place. You may not agree with this, but if it strikes you once it won't make any difference whether you do or do not agree.

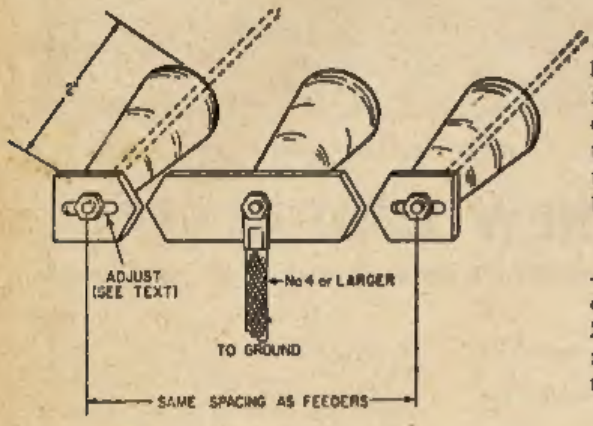
Radio Amateurs for the most part invite destruction by lightning by neglecting to provide any protection against it. The antenna usually associated with Amateur Radio transmitting equipment is most vulnerable to lightning due to its length and height. To validate your insurance, your antenna installation must comply with the National Board of Fire Underwriters Electrical Code which says:

Lightning Arrestors.—Transmitting Stations. Except where protected by a continuous metallic shield (co-ax), which is permanently and effectively grounded, or the antenna is permanently and effectively grounded, each conductor of a lead-in for outdoor antenna shall be provided with a lightning arrestor or other suitable means which will drain static charges from the antenna system.

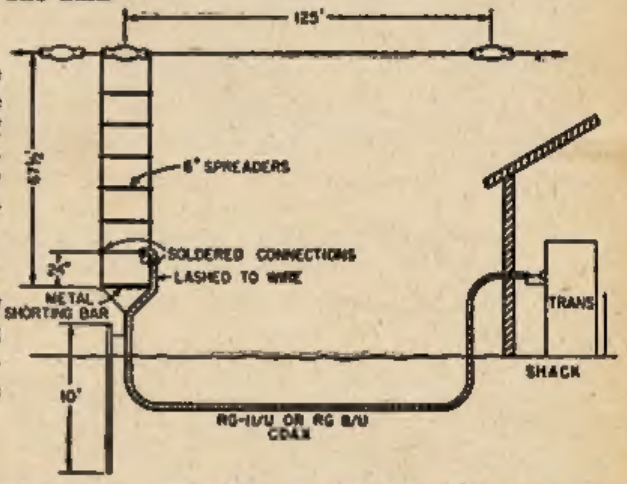
A similar requirement is applicable to a receiving antenna should it extend outside the building in which the receiving equipment is located.

Many years ago my antenna was struck by lightning. At that time, there was an insurance requirement which said that a 100-ampere switch should be used for grounding the antenna when the station was not in operation. The lightning completely destroyed most of the antenna wire, burned the wooden base of the lightning switch and burned the insulation off the No. 4 copper grounding wire between the switch and the ground stake. As the switch was in the grounded position, no damage to the house or radio equipment resulted.

Without adequate grounding, hazardous voltages can build up on an antenna due to other causes. About 1920, while attending Carnegie Tech., Pittsburgh, Penna., an experience was observed which will be of interest in this connection. The antenna at 8XC consisted of 10 wires 600 feet long, approximately 165 feet above the ground at its centre. It ran across a gully, at the bottom of which was a mainline railroad track. When locomotives pulling heavy trains passed under the antenna, the static charge built up was sufficient to cause flash-over of an 8-inch gap. The flash repeated approximately every five seconds while the engine was immediately beneath the antenna and less frequently when it was approaching or leaving the area below the antenna.



← **Fig. 1.—A simple lightning arrestor made from three stand-off or feed-through insulators and sections of ¼" thick brass or copper bar.**



→ **Fig. 2.—Sketch of co-axial fed grounded Zepp antenna. Adjustment is discussed in the text.**

LIGHTNING ARRESTORS

What steps should we take to protect ourselves and our equipment against these hazards? You will observe that the Electrical Code specifies that the lead-in may be a coaxial cable, the shield of which is permanently and effectively grounded. This means that a ground connection, using No. 4 wire or larger, should be made to the shield of the co-axial cable at the point where it is nearest to the ground outside of the house. If the cable can be run underground, a grounding stake should be located at the point where the cable enters the ground. The grounding stake, to be effective in soils of average conductivity, should be not less than 10 feet long, and if possible, plated with a metal which will not corrode in the local soil.

When open-wire feeders are used, a lightning arrestor is required. The type of lightning arrestors provided for residential broadcast and television antennae may be suitable for very low power installations, but where higher power is used, they are inadequate, since the radio frequency voltage on the transmission line is usually enough to cause them to operate, i.e. flash over.

During the early Thirties, advice was obtained from the Naval Research Laboratory at Washington, D.C., on a suitable grounding arrangement for lightning protection for a 1-kw. installation. It was their suggestion that a spark gap be provided between each of the two open-wire feeders and a centre contact, grounded with No. 4 or larger wire. It was recommended that ¼" x ¼" flat brass rod shaped as shown in Fig. 1 be used for the gaps. Each of the gaps should be set sufficiently far apart so as to prevent flash-over during normal operation of the transmitter. It was found that because of the standing waves on the open-wire line a gap of approximately 3/16 inch was necessary.

This device worked very well during thunderstorms as it would start sparking intermittently when a storm was approaching. As the storms passed over the immediate area, the frequency of discharge would increase. During heavy thunderstorms, there was a steady stream of sparks at the gaps. It was possible to operate the transmitter with relatively little effect on its performance even while the static charges were jumping across the equipment, but this was seldom done because of a personal reluctance to be so close to the antenna system.

It has been my belief that a properly installed spark gap on an antenna system drains off sufficient static from the immediate area to prevent a direct hit. This view stems from the fact that during the twelve years these gaps were in use there was never an occasion when a lightning hit came closer to our house than a half block when a neighbour's house was struck. This

* Reprinted from "QST," July, 1955

"THE LANDING OF CAPTAIN COOK" by PHILIP FOX. By Courtesy of the NATIONAL GALLERY OF VICTORIA.

"CAPTAIN COOK DISCOVERS NEW CONTINENT"

This was stirring news to the world of 1770, but it was three months before King George III of England heard about it.

Today, news like this would be flashed round the world by radio.

In Australia, from Cape York to Hobart, from Brisbane to Perth, radio listeners hear immediately about any dramatic national incident.

"RADIO AUSTRALIA flashes daily news around the world. Jocelyn Terry is shown here broadcasting messages from home to Australians in lonely outposts in Antarctica.

RESEARCH AND THE ELECTRICAL INDUSTRY

For years Shell scientists have worked to improve various parts of electrical equipment, such as enamelled wires, insulating materials, and resins which effectively seal radio condensers.

Shell also helped in the initial development of low vapour pressure oils, greases and sealing compounds necessary to create the required vacuum in valves. These and other problems solved in SHELL laboratories have enabled radio manufacturers to produce the high-fidelity electrical goods marketed today.

could have been a happenstance, but it is the fact, nevertheless.

In the Pennsylvania Dutch country around Lancaster and York, most barns nowadays are protected from lightning by a length of old trolley wire mounted on poles extending about 10 feet above the roof. Both ends of the wire are grounded and, so far as can be learned, no barn so protected has suffered lightning damage.

DIRECT GROUND CONNECTION

Many of our modern antennae permits relatively simple methods of direct ground connection, which do not interfere with the operation of the antenna Rotary beams using a T or gamma match may have the centre of each of the elements, including directors and reflectors, grounded to the tower on which they are mounted. Two and six metre beams should have the supporting pole grounded. If the antenna is mounted on a wooden pole or on the top of a house, a No. 4 or larger wire should be extended from the beam to the ground, using insulators where the wire comes close to the building. The ground wire should be spaced away from metal objects such as gutters, etc., or should be solidly grounded to them. If the connection to such objects is not a good one, but is variable in resistance, it may be a source of spurious signals when excited by the transmitter. This often results in interference with your own or your neighbours' broadcast or television reception.

For the past seven years, the antenna shown in Fig. 2 has been used at W4ZG, Winston-Salem, N.C. It gives what appears to be good lightning protection. It hasn't been hit yet. And best of all, signal reports have been more than satisfactory on power comparisons made with other stations under like conditions.

The antenna may properly be called an end-fed Zepp. Since much of the work done here is on the Tar Heel Net frequency of 3865 Kc., the antenna was cut to centre on this frequency. Operation is not confined to this frequency, however, as many contacts are made even at the high end of the band without any retuning or adjustment of either the driver or final stage tuning circuits.

The antenna is 125 feet long and the quarter wave Zepp feeders are 62½ feet long, spaced 6 inches apart. The feeders are tied together at the lower end and grounded. A metal rod 6 inches long is used as the lowest spacer. RG-11/U (72 ohm) co-ax is used to feed the Zepp feeders. The shield of the co-ax is attached to the feeder which goes to the antenna and the centre conductor goes to the other feeder which dead ends at the antenna. The point of attachment is about 24 inches from the shorting bar. The co-ax is tied to the feeder to which the shield is connected and follows it back to the shorting bar and then follows the grounded lead to the ground stake and from there runs underground to the house.

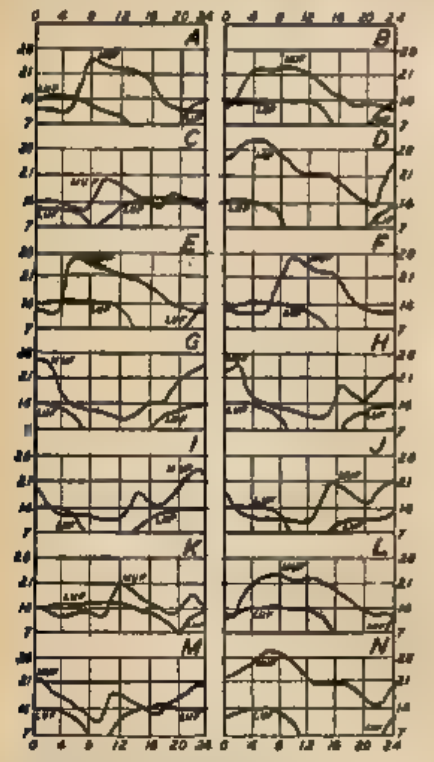
By now you are wondering why the shield is connected to the feeder which goes to the antenna instead of being attached to the feeder which dead ends. Actually, it makes no difference which way you do it, except that if you use a bridge to check the standing wave ratio, you will have more trouble with induced voltages from local broadcast stations if you reverse the connections since the feeder plus antenna picks up much more of this broadcast field voltage than the dead-ended feeder alone will pick up.

Another benefit from this antenna which was entirely unexpected is the reduction in harmonics reaching the antenna. At the desired frequency, the 4 feet of wire between the ends of the co-ax and the shorting bar serve as a transformer to match the impedance of the co-ax to the impedance of the open-wire feeders. At other frequencies, however, this is not the case, and the higher-order harmonics are effectively suppressed. No other filter is used as W4ZG for this purpose and there is no observable interference on a television receiver connected to an antenna just 15 feet away from the Zepp feeders.

Should you wish to use this antenna on other bands, you may do so by reducing the dimensions in accordance with standard antenna formulae. The point of connection of the co-ax to the Zepp feeders is not critical and may vary somewhat under different surrounding conditions. It can best be done by measuring the s.w.r. at the transmitter end of the co-ax at several different test positions, but if no bridge is available, the connection of the co-ax to the Zepp feeders may be made 24 inches from the shorting bar for 80 metres, 12 inches for 40 metres, 6 inches for 20 metres, and 3 inches for 10 metres[1]. It is desirable that the feeder spacing be reduced at the higher frequencies as the length of the shorting bar is a factor in the impedance match.

1 For antenna systems in which the antenna and feeder lengths are the same as above in terms of wavelength.—Editor.

PREDICTION CHART FOR NOV., '55



A—Eastern Aus. to West. Europe—Short Route.
B—Eastern Australia to South Africa.
C—Eastern Aus. to West. Europe—Long Route.
D—Eastern Australia to Far East.
E—Eastern Australia to Mediterranean.
F—Western Australia to Western Europe.
G—Eastern Australia to North West U.S.A.
H—Western Australia to North West U.S.A.
I—East. Aus. to North East U.S.A.—Short Route.
J—Western Australia to North East U.S.A.
K—East Aus. to North East U.S.A.—Long Route.
L—Western Australia to South Africa.
M—Eastern Australia to Central America.
N—Western Australia to Central America.

USE OF ELECTRONIC VALVES

Recently, while building a small transmitter, the valve driving the 807 would not seem to function correctly It was one of the miniature 9-pin all glass types. Investigation showed a short between the control grid pin and another pin. This other pin was labelled, in the handbook, "IC," which we know stands for "internally connected." It was assumed this meant connected to cathode and it had been strapped to the cathode tag on the bottom of the valve holder for convenience in wiring and layout.

On reading through the "British Standard Code of Practice on the use of Electronic Valves" it is learned that any pin labelled "IC" should be severely left alone. This pin, or any pin labelled "IC" may be connected anywhere or to any other electrode in the valve without the connection being specified, in fact, it states that valves of the same type, but of different manufacture, will most likely be connected differently internally. It even states that valves from the **same** manufacturer may be connected differently, depending on when they were made.

There is a lot of interesting "dope" in this book for those who employ a large number of valves and for Amateurs, too. For instance, it recommends that the cathode to heater capacity never be put across a tuned circuit. This is quite common practice with Amateurs and probably accounts for some of the unsatisfactory signals.

It further recommends that cathode keying should not be so arranged as to leave the cathode "in the air" when the key is up. A maximum resistance of 0.25 megohm should be connected between cathode and heater. Similarly with screen grid keying. This, of course, is not generally used anyway as it does not always kill the signal when the key is up.

The book has plenty to say about over-running valves—which in any language is to be depreciated. It is well known that the envelope should be kept cool by either plenty of natural air circulation or forced draft. Since reading this, a small fan has been arranged to blow the final! It is probably not so well known that it does not matter much—within reason—what the ambient temperature of air is that circulates around and past the valve, that is, tropics or the North Pole, as long as there is sufficient air.

One final tip. It is bad practice to use spare valve holder contact lugs as anchoring points in circuit wiring. Sometimes the pins go inside the valve and although not connected, the application of h.t. can upset the functioning of the valve.

—Reprinted from "R.S.C. Bulletin," March-April, 1955.

TORN

ANTI-TVI FILTERS FOR THE AMATEUR TRANSMITTER

BY H. F. RUCKERT,* VK2AOU

It cannot be said often enough that we must first build the transmitter with as low harmonic power output as possible and the chassis and shielding cabinet must be free of r.f. or the best low-pass antenna filter and mains line filter will be of very little help. The filter will not cure all ills we may have built into our transmitter. How this cure can be effected, before we use filters, was described by the writer in an earlier issue of "Amateur Radio." The filter on our transmitter will not offset the design features the neighbours' t.v. receiver may lack, making it hard to prevent t.v.i.

The following description of a typical low-pass filter shows how we can plan, calculate, build, test and use these filters. In spite of a few formulae there are no more mathematics involved than our children learn now at school. If you know how to use a slide rule and a grid dip meter, it will not take you longer than 20 minutes to calculate the filter components and frequencies, and the aligning can be done in a further 20 minutes.

Fig. 1 shows how a low-pass filter can be inserted between the pi-filter network final of our transmitter and the antenna coupler.

The pi network helps to reduce harmonic output, so does the antenna coupler. The coupler permits us to use any aerial we may have and still have the benefit of the filter. The filter can only work efficiently if we have a specified impedance on both filter terminals. Of course there must be a low standing wave ratio of less than 2 : 1 or we will overload the filter components, causing their failure or excessive losses.

The filter we will describe now can be placed anywhere in a 70 ohm flat co-ax line, even 52 ohm cable will not make much difference to the filter performance.

If we do not use the antenna coupler we can go directly from the filter output terminal to the flat line (52 to 70 ohm cable), which may be twin lead or co-ax cable If a pi-network tank is not used a link coil has to be placed at the filter input and coupled to the tank circuit. The method shown in Fig. 1 has several advantages over other possibilities as outlined above, because any band below the filter cut-off frequency and any aerial may be used regardless of the type of feeder we may have.

Fig 2 is the attenuation curve we can expect with the type of filter we are planning now.

The h.f. DX hunter will be interested in suppressing the 3rd harmonic of 14 Mc., the 2nd harmonic of 21 Mc., and of course any higher harmonic frequency. Therefore he does not want any attenuation below 30.5 Mc., but he wants full attenuation at 41 Mc. and higher.

The v.h.f. Amateur wishes to get 60 Mc. and 148 Mc. without losses, but the 3rd harmonic of 60 Mc. should be attenuated and also any harmonic of higher order.

Attenuation of about 60 db. (1000 : 1) of the undesired harmonic between the input and output terminals of the filter is usually regarded as sufficient. A filter with more sections and a higher theoretical attenuation may not pay because the transmitter chassis may not be free enough of r.f., including harmonics, that may be radiated to the mains, water pipes, gutter, etc.

Fig. 3 shows the low-pass filter, now an integral part of practically any Amateur transmitter, home-built or manufactured, in U.S.A. at the present time.

The filter starts, from left to right, with an M-derived section, there is a constant K-pi section in the middle, and again symmetrically an M-derived end section.

The formulae we find in the A.R.R.L. Handbook, and in other text books, are always correct for a chain of similar filter sections. If we use only one of each, we have to change the formulae as follows:

$$L1 = m \times Lk$$

$$L2 = \frac{1 - m^2}{2\,m} \times Lk$$

$$m = \sqrt{1 - \left(\frac{fc}{f_\infty}\right)^2}$$

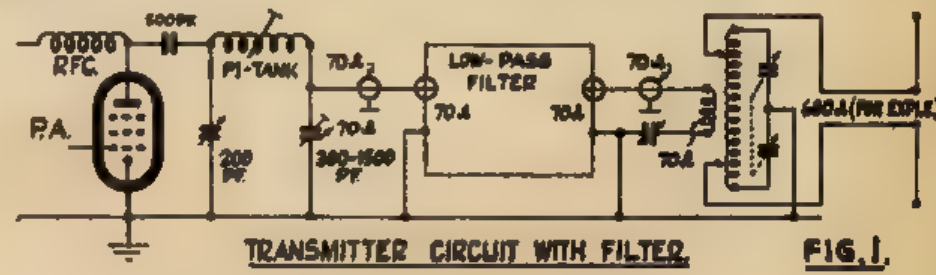
L1, L2, and Lk—See Fig. 3.
m = values between 6 and 8 (often used), m = 6.5 in our example.
fc = the cut-off frequency where the attenuation begins to rise steeply (in c.p.s.).
f_∞ = a high frequency with extremely great attenuation (in c.p.s.).

$$Lk = \frac{R}{\pi \times fc}$$

$$Ck = \frac{1}{\pi \times fc \times R}$$

$$C2 = \tfrac{1}{2}\, m\, Ck$$

where—
Lk is in henries.
Ck, C2 is in farads.
R in ohms.
fc in c.p.s.



TRANSMITTER CIRCUIT WITH FILTER. FIG. 1.

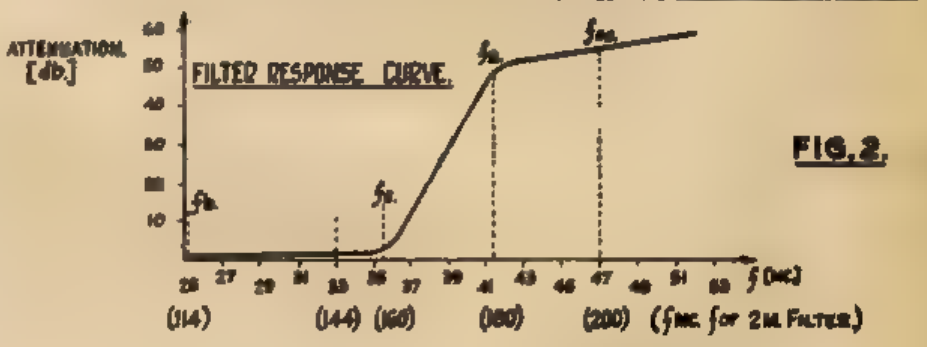
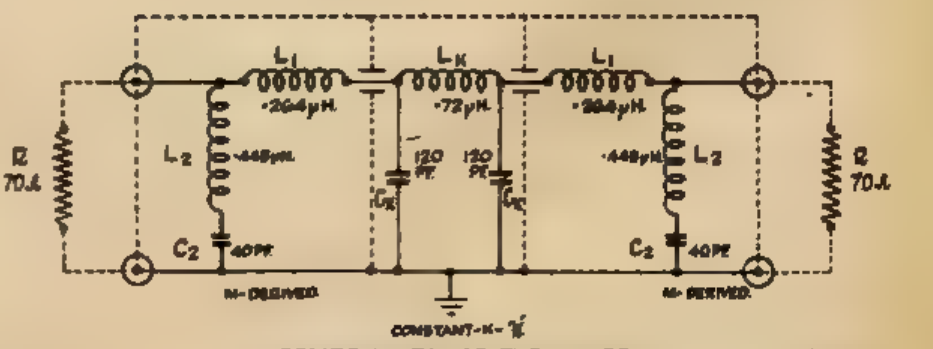


FIG. 2.



COMPONENTS OF THE FILTER. FIG. 3.

* 25 Berrille Road, Beverly Hills, N.S.W

R is the input and output impedance, 52 or 70 ohms for example, depending on the type of cable and feeder used.

C2 and Ck are filter capacitors, see Fig. 3.

We get so far if we study the Handbook, but we would like to know how to find fa where the attenuation has the first high value. Making a filter with the formulae given above and m near 6.5, we will find that:

$$fa = \frac{1}{2} (fc + f\infty)$$

when we check the completed filter with the grid dip meter. Since we like to determine fa first and calculate $f\infty$ we can say:

$$f\infty = 2\ fa - fc.$$

With these formulae we can calculate all filter components. We only need now to find out the frequency fb to be able to tune the constant K section of the filter.

COIL TABLE

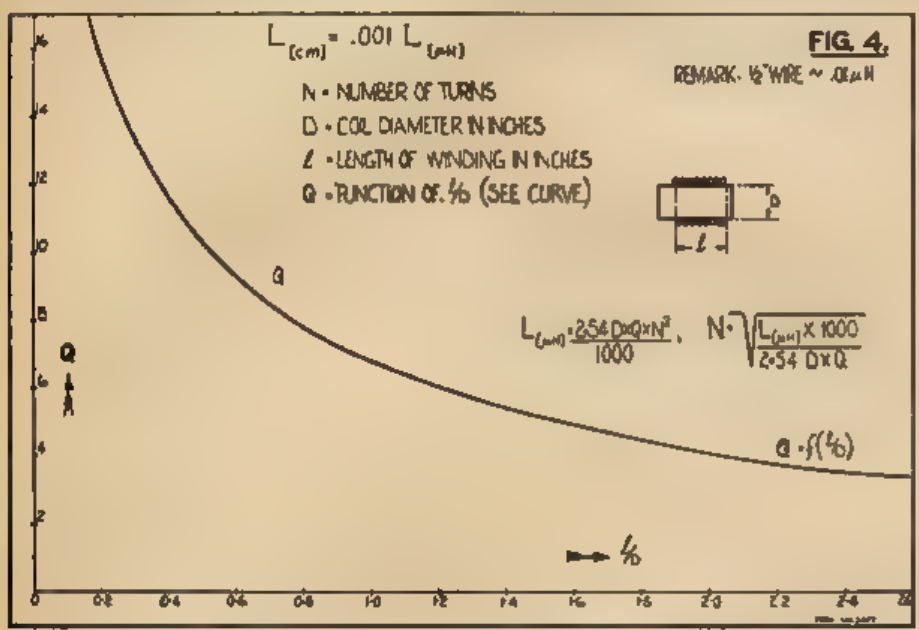
	Coil Diam.	Coil Leng.	Turns	Inductance
L1	½"	⅞"	6.5	0.264 uH.
L2	½"	⅜"	9	0.445 uH.
Lk	½"	1½"	13	0.720 uH.

No. 14 to 18 s.w.g. wire.

The capacitors C2 and Ck are preferably NPO (temperature coefficient of the capacity zero) ceramic disc type capacitors with a power factor better than 0.05%. For Ck, tubular stand-off capacitors of NPO dielectric are very easy to mount. With a standing wave ratio on the co-ax line where the filter is installed of not more than 1.3 : 1, receiver type capacitors are satisfactory for transmitter of several 100 watts input.

ALIGNING FILTER

The alignment of the filter is no problem with a calibrated grid dip meter using the following procedure:



$$fb = \sqrt{\frac{25.33}{Lk \times \frac{1}{2} Ck}}$$

where f is in Mc., L in uH., C in pF.

With m values of about 6.5, fb will be about as follows:

$$fb = \frac{fc + f\infty}{3.2}$$

We know now all C and L values and the three frequencies, the filter sections will have to be tuned to. We have also determined the frequency where we can expect full attenuation (fa).

Fig. 4 gives us the formula and the curve for the coil form factor [Q = f (1/D)] and it is only a matter of minutes to calculate the coil turns and dimensions if we have a slide rule. All explanations are on that graph.

For our special example a coil table may be given with the dimensions of the coils used in the filter after these had been correctly tuned so that any lead inductances are already taken into account, as these do not appear in the coil calculations. Half an inch of wire represents about 0.01 uH.

Fig. 5 demonstrates how the g.d. meter can be coupled with a single loop link to the small coils in their shielding compartments. For aligning we do not need the three turn link on the left side, the two 50 to 70 ohm matching resistors nor the Ge diode r.f. voltmeter on the right side of the circuit.

1. The first step is to separate L2 on each filter end from the rest of the circuit and we have to make a very short short-circuit connection at the co-ax cable connectors. This is shown in detail on Fig. 6. With the g.d. meter we check the tuning of L2 to $f\infty$ = 47 Mc. by varying the spacing of the coil turns. This is done on both filter ends with the L2 coils.

2. The second step is to wire the two filter sections as shown in Fig. 7, which means that Lk is removed as well as the short over the co-ax terminals. With the g.d. meter coupled to the L1 coils (one after the other), we adjust only L1 to the cut-off frequency fc — 35.5 Mc. by spacing the coil turns correctly. If we tune L1 to a too low frequency we get attenuation in the 28 Mc. band. If we tune this coil too high we get holes in the attenuation curve at high frequencies which may make the filter useless.

3. The third step is to disconnect the already tuned coils from Lk and use only the components as shown in Fig. 8.

By changing the spacing of coil Lk we can tune this section to fb = 25 to 26 Mc. Comparing measurement and calculations we will see that they agree even at these frequencies up to within 10%, proving that theory and practice must not always be hopelessly apart.

We now connect a three-turn link to the filter input and the Ge diode r.f. voltmeter (calibration is not required) to the output terminals of the filter. Also parallel to the terminals we have to put 50 ohm low inductive carbon resistors which will have a somewhat higher impedance depending on their

construction. Coupling the g.d. meter now direct to the three-turn link and tuning from 3.5 Mc. up to 30 Mc. will not show any attenuation at all if we take into account that our g.d. meter does not give a uniform output of r.f. over the whole range. There is a very slight attenuation at 30.5 Mc., of less than 1 db. Three db. will be observed at 35.5 Mc., and now comes a steep drop in reading of the output meter. At 40.8 Mc. we can increase the coupling to the g.d. meter and by carefully tuning the generator we will see that the sharp peak of high attenuation is near 41 Mc. Even the tightest coupling to the g.d. meter will not give any output voltage reading. This shows that the attenuation must be at least 40 db. and 50 or more db. can be expected.

It is a good idea to tune up to 200 Mc. to ascertain if there are any holes in the attenuation curve caused by self resonance of capacitors with their leads. Re-arranging of components will help.

The low-pass filter is now ready to be placed in the transmitter as indicated by Fig. 1. A test run with different transmitter output frequencies will prove that there is no attenuation on any band which may effect the DX efficiency.

The writer had a small electric globe parallel to the dummy antenna and was checking the output, with or without the filter, maintaining the same drive and input to the final, with a photo electric exposure meter. There was no detectable difference.

After running the transmitter with full power for 30 minutes with the filter inserted, the lid was opened, and only the coils showed a very slight increase in temperature of not more than 30°F. whilst the ceramic capacitors remained cool.

If our transmitter was shielded, as outlined before, the rest of the radiated harmonic energy should now be attenuated by a ratio of 300 or 1000 to 1, which should be enough in most cases.

These filters may be built for other impedances or symmetrically as well or with more constant K π sections.

Fig. 5 shows the layout of the components. It is important that C2 and L2 are soldered as closely as possible to the co-ax connectors. L2 should be placed at right angles to L1 to reduce magnetic coupling.

The writer used, as shielding for the filter, three paper capacitor cans which were soldered together to give the right size of 2 x 2 x 7½ inches. Ceramic feed-through insulators were used between L1 and Lk. The lid should have good electrical contact to the walls between the sections and all the way around the edge and should be bent over the cans. At least six screws should hold the lid in place. The filter box must have a very good contact with the r.f.-free transmitter chassis.

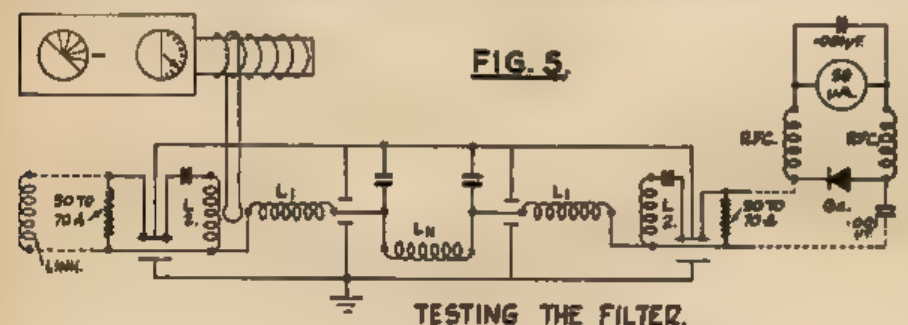


FIG. 5.

TESTING THE FILTER.

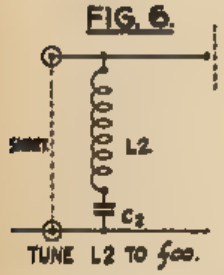


FIG. 6.

TUNE L2 TO f_{co}.

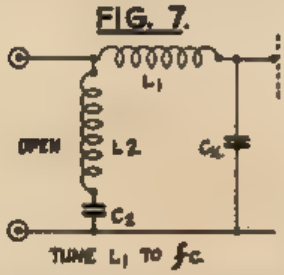


FIG. 7.

TUNE L_1 TO f_c.

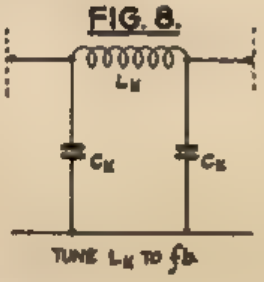


FIG. 8.

TUNE L_k TO f_b.

HOW TO TUNE THE FILTER SECTIONS.

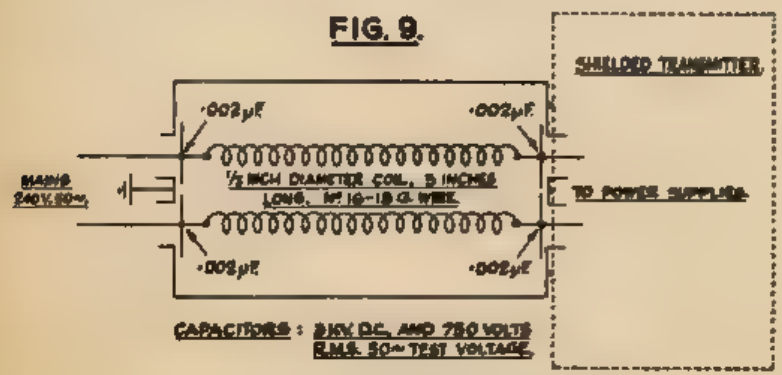


FIG. 9.

MAINS LINE FILTER

DRN-VK5AFZ

A MAINS LINE FILTER

The now described untuned filter (Fig. 9) is mainly used to prevent r.f. from the transmitter power supplies escaping along the mains cable. Similar filters are recommended for use in all cases where r.f. may try to leave the shielded h.f. stages via the cables going to the power supplies.

With equal results we can, and should, filter microphone, morse key, monitor or other control cables coming from the transmitter. For the microphone cable we would have to use 100 pF. capacitors to avoid by-passing the a.f.

There is not much to say about the construction of these filters. The coil or coils are wound on ½ inch formers which could be bakelite tubes. The winding is 3 inches long, using No. 16 or 18 gauge copper enamelled wire.

It is important to use only co-axial capacitors because no other style will have short enough leads, not even H-K ceramic discs, and therefore a low enough inductance to be effective at the frequencies which must be by-passed.

Ceramic button type capacitors of about 2000 pF. capacity, which are directly soldered to the shielding can, are ideal. The coil leads are soldered to the centre rivet. H-K ceramic capacitors can now be made to take any d.c. or 50 c.p.s. voltage we may have in our Amateur transmitters. Tubular feed-through capacitors of sufficient wall thickness to work safely can be used too.

Even a t.v. receiver advertised to be "the world's best receiver" may lack front end selectivity and a high-pass filter could help. This type of filter may be described later.

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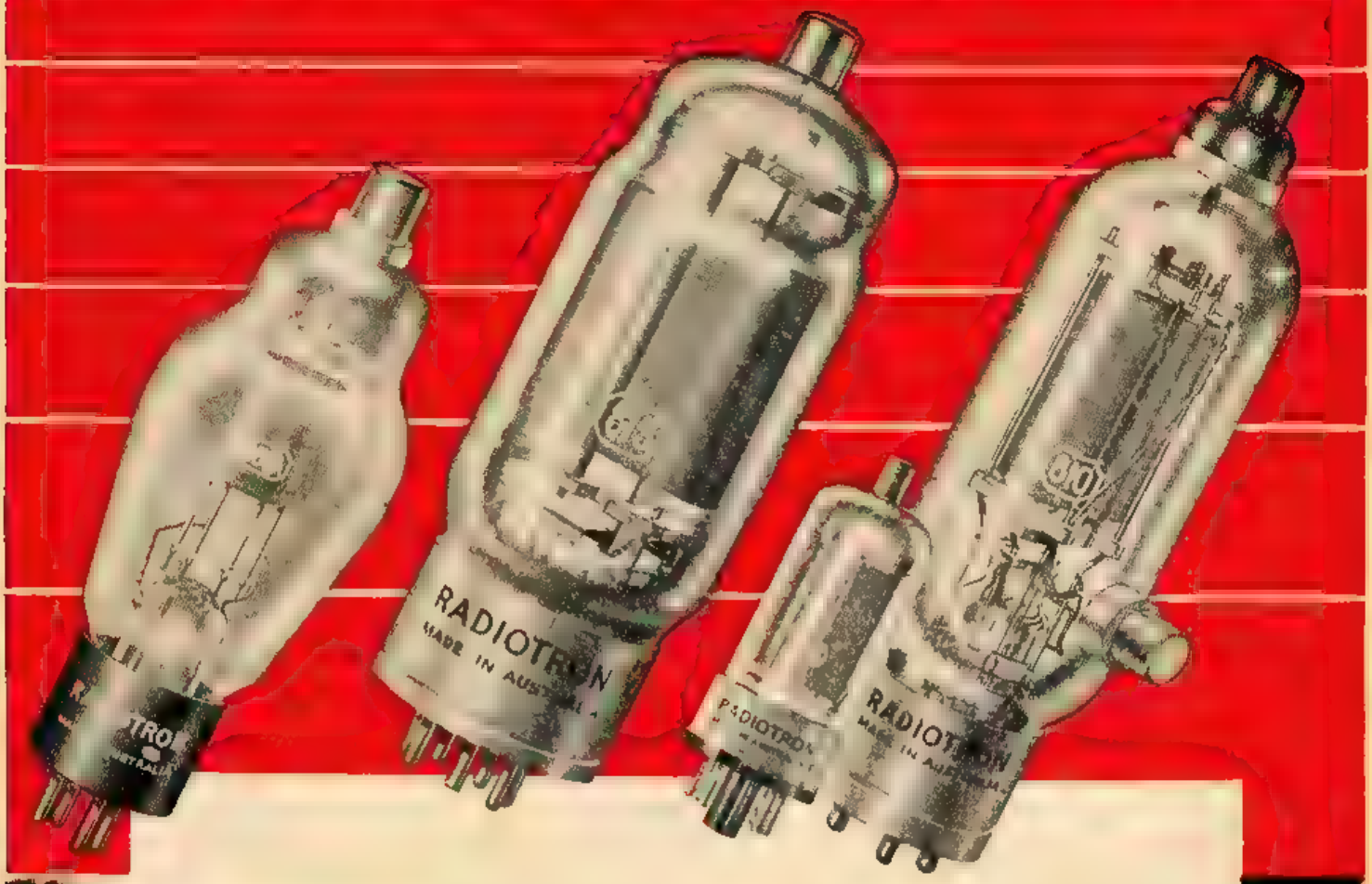
AWARDS FOR TECHNICAL ARTICLES

Following the announcement in the November, 1954, issue of "A.R.," Awards for Technical Articles have been made to: N. L. Southwell, VK2ZF, "Wide Band Audio Phase Shift Networks," June; J. R. C. Miller, VK2ANF, "The New Look in Frequency Modulation," October; G. M. Bowen, VK5XU, "Twin Lead Sprigs," April.

DO NOT FORGET!

The closing date for copy for the January issue is 2nd December.

RADIOTRON POWER VALVES



Today's high standards of radio performance are dependant upon the use of first quality components.

Radiotron valves are manufactured to exacting standards which ensure you of the ultimate in performance at all times.

Be sure of the quality and consistency of your signals by using Radiotron Power Valves.

Important: When ordering valves, be sure to mention "Amateur Radio" so that priority can be given to your order.

AWV **RADIOTRON**

AMALGAMATED WIRELESS VALVE CO. PTY. LTD.

Ross Hull Memorial V.h.f. Contest, 1955-56

RULES

1. The Contest will take place in the 50-54 Mc., 56-60 Mc., 144-148 Mc., and 288-296 Mc. bands, and will commence at 0001 hours E.A.S.T. on 1st December, 1955, and will continue until 2359 hours E.A.S.T., 31st January, 1956. Interstate, Intrastate and Overseas contacts are allowed. Cross-band working is not allowed. L.A.O.C.P. licensees are encouraged to work on the 144 Mc. and 288 Mc. bands.

2. Only one contact on each band with any one station, per twenty-four hours, commencing midnight E.A.S.T., to count for scoring purposes.

3. Exchange of a serial number will constitute a contact.

4. The serial number of five or six figures will be made up of the RS (telephony) or RST (telegraphy) report plus three figures which may commence with any number between 001 and 100 for the first contact and which must increase in value by one for each successive contact, e.g. if the number chosen for the first contact is 050, then the number for the second contact must be 051, for the third 052, and so on. If any contestant reaches 999, then he must start again 001, and continue as above.

5. **Scoring.**—Points allotted, apply to each band worked.

Interstate and Oversea Contacts: 5 points for the first contact with any particular station, 4 points for the second, and so on to the fifth contact for 1 point, after which no more scoring contacts with that particular station can be made on that band, for the duration of the Contest; e.g. VK5ABC may work VK2XYZ five times on each of the four bands, for a total of 20 contacts.

Intrastate Contacts (for VK Call Areas only).

(i) Five points for the first contact with any particular station, four points for the second and so on to the fifth contact for one point, after which no more scoring contacts with that particular station can be made on that band for the duration of the Contest.

(ii) Stations located beyond a **radius** of 100 miles of any Capital City (Federal Capital excepted) will double their score for ALL contacts; e.g. VK3ABC (Mildura) works VK3XYZ (Melbourne) for the first contact: VK3ABC scores 10 points, while VK3XYZ scores 5 points. If VK3ABC works VK3PQR at Red Cliffs, both score 10 points for the first contact.

6. **Logs** shall contain the following information: Date, time (E.A.S.T.), **band**, call of station contacted, serial number sent, serial number received, points claimed for the contact, and at the foot of each page the total points claimed; and at the end, the grand total.

Logs shall be signed by the competitor, together with a declaration to the effect that the station was operated strictly in accordance with the rules, and spirit of the Contest. The decision of the Federal Contest Committee shall be final and binding.

Logs must be received by the **Federal Contest Committee, Box 1234K, G.P.O., Adelaide, South Australia,** not later than **1st March, 1956.**

7. Entries will be accepted from all States of the Commonwealth and Districts of New Zealand. Check logs from other countries would be appreciated by the Contest Committee.

8. The regulations governing the control of Amateur Radio in each contestant's country must be observed.

9. **Awards:** (a) For the purpose of Awards, Northern Territory will count as a separate call area.

(b) The outright winner of the Contest within the Commonwealth of Australia will receive an appropriately inscribed Certificate.

The top financial member of the W.I.A. will hold the Ross A. Hull Memorial Trophy for a period, and in addition will receive an appropriately inscribed photograph of the Trophy.

(c) The highest scorer in each call area in Australia and New Zealand will be awarded a Certificate. The Federal Contest Committee reserves the right to make any additional Awards.

(d) A Certificate will be awarded to the L.A.O.C.P. licensee who gains the highest score in each call area. (Operation must be confined to the 144 Mc. and 288 Mc. bands with A3 emission, to conform with the Departmental Regulations.)

10. The decision of the Federal Contest Committee will be final and binding upon all matters pertaining to this Contest.

OLYMPIC GAMES COMMUNICATION DEMONSTRATION

Following an approach to the W.I.A. by the Olympic Games authorities, the 2 metre gang was organised by Len Moncur, 3LN, to demonstrate the possibilities of conducting radio communication between the Melbourne Cricket Ground and various spots along the route of the marathon walking events of the forthcoming Olympic Games. The route is to Springvale via Dandenong Road and return to the M.C.G.

The basic requirement was for a 144 Mc. base station set up at the M.C.G. working to mobiles along the route. Past experience of field days, mobile tests, fox hunts, etc., gave full support to the suitability of v.h.f. for the job. After several discussions at the V.h.f. Group meetings, it was decided that, at least for this test, a better base station location than the M.C.G. site would not be amiss, and Alf 3IE, checking with a contour map, came up with the suggestion of the Malvern Town Hall clock tower, this being not only suitably situated, but also of considerable altitude. Alf arranged access to the building and our thanks are due to him and to those who gave the necessary permission.

Being now assured of good signals from the mobiles, it was deemed that it would be a simple matter to relay two way via radio link direct to the M.C.G if necessary.

3IE and 3YS, armed with a 2 metre transmitter and receiver and a 5 over 5 portable beam, set up the base station in the small room above the clock, with the beam mounted on the open top landing. The wonderful view obtainable from the tower provided compensation for the long climb and visual justification for the selection of the site. The weight of the equipment and general set-up of the stairs made it necessary to remove the various sections from the transmitter and receiver rack and carry them up piece by piece and reassemble. The convenient construction of 3TO's rig made this a relatively easy matter, and by 12 noon the base station was in operation. 3ZBJ and friend, John Hamilton, provided a test contact, and responded willingly to a request for assistance in the afternoon when the gear had to be dismantled and removed.

At 2.30 p.m. four mobiles, 3VZ, 3ALY, 3ZBU and 3APB, met two officials of the Olympic Games Athletic Committee at the M.C.G. 3LN was unable to participate due to a bereavement in his family. It was arranged that one of the officials would accompany 3VZ on a tour of the route, followed at intervals by 3ZBU and 3APB; all to maintain contact with the base control station operated by 3IE. 3ALY remained at the M.C.G. to enable the other official to hear the base station contacting the mobiles with their position reports. 3ALY later moved off along the route, and all cars maintained contact with the base station throughout the test, with excellent signals both ways.

On the return journey, further tests were made including working between the cars. Tests from so-called "dead spots" were quite successful.

All gathered at the Town Hall for a discussion and inspection of the base station site. Officials were extremely pleased and enthusiastic with the results and voted it the best and most successful demonstration they had witnessed. Their congratulations to the Institute were very encouraging and provided compensation for the members' efforts. We, in turn, thank all those who participated so enthusiastically. It is hoped that outside interests will not preclude the Institute from putting its efforts and results into practice.

The advisability of all mobiles working on a spot frequency for such a job was evident, but lack of time did not permit this to be arranged. The above account provides another indication that the W.I.A., when faced with a job, can, and will, do it with the co-operation of its members.

VK3 AWARD FOR 100 V.H.F. CONTACTS

Since this award was originally announced in 1951, three of these certificates have been issued, firstly to Jim 3ABA, then to Col 3FO and Fred 3YS. This award is available to those in VK3 who make 100 or more contacts above 100 Mc

The rules are as follows:—

(1) Awarded to those VK3 Amateurs holding either the limited or the full license, who submit evidence of having contacted two-way, at least 100 other stations on Amateur bands above 100 Mc., dating from 1st January, 1946.

(2) Confirmations to show the usual QSL information including call sign and location, date contact was made, band used and report.

(3) All authorised bands above 100 Mc. and any authorised type of emission may be used, provided always that the Amateur Regulations are observed.

(4) The claimant licensee may have operated anywhere within Victoria and either he or the station worked may have operated mobile, portable or fixed or may have changed address.

(5) Only one contact per licensee may be claimed regardless of band used or method or location.

(6) Claims to be submitted in writing to Secretary, Vic. Div., together with a legibly written list of the confirmations submitted. The confirmations should be forwarded by registered mail and return postage should accompany the application.

(7) An attractive certificate to be awarded to each successful applicant.

(8) The V.h.f. Group reserves the right to modify the rules if necessary (subject to sanction of Vic. Division Council).

(9) In case of any dispute concerning a claim, the scrutineers' (at present the Chairman and Secretary of the V.h.f. Group) decision to be accepted as final.

JANUARY ISSUE

This time every year a plea is made to Advertisers and Contributors to forward copy early for the January issue.

To explain once again, as the printers close down for annual holidays from just before Xmas until the middle of January, it is necessary, if the magazine is to be posted to you on the 1st of January, for the magazine to be printed before Xmas.

Therefore it is requested that material for the January issue must reach 191 Queen Street, by the SECOND OF DECEMBER.

Your co-operation in this matter will be appreciated.—Editor.

FIFTY MEGACYCLES AND ABOVE

FREQUENCY CHANGE FOR FIFTY MEGACYCLES BAND

56-60 Mc. available as from 1st November, 1955!

50-54 Mc. closes on 31st January, 1956!

NEW SOUTH WALES

The passive relay or slave antennae experiment was carried out by the Group on Sunday 11th Sept., with some success and interesting information was gathered for future tests. Portable stations taking part were 2HL in the Hartley Valley with 2AOA operating the slave antenna on Mt. York above. 2ZAR and 2DB at the Hawkesbury Lookout with slave antenna and 2IC on the flats below 2ATO, 2AZO and 2LG on Mt. Tomah with slave antenna, 2ANF, near Dural, acted as control station.

Several tests were made during the day 2HL was heard by 2ANF direct, which was expected to be impossible, however an increase in 2HL's signal was detected when the slave antenna on Mt. York was brought into use. 2IC's signal, via 2ZAR and 2DB's slave antenna, was being sent back to 2ANF over the top of him. 2IC, incidentally, was not being heard direct. Funny things were happening to the signal, but it is not known whether it was coming from the antennae which were set up or from rock walls which Bert was firing his sig at or from the many cars which were moving around the lookout.

On Mt. Tomah two three over three beams were used to re-direct Newcastle signals to Sydney 2ANU, 2VU and 2ADS co-operated in the Hunter district. Several tests were carried out with no results. However 2ADS reported being abla to hear 2ADA via the slave ant. but not direct.

A surprise Scramble was held on Sunday night, 18th Sept., after the 2WI broadcast, about 28 stations taking part. After about two hours' QRM and much turning of beams, scores were taken and Peter 2JX filled first place with 34. 2ZAR 2APQ, 2LG, 22, and 2HE with 21

The Spring Field Day held on Sunday, 2nd Oct., was held in conditions approaching midwinter. The very strong wind which blew all day gave those out on mountain tops a real job keeping beams up and pointing in the right direction. Bad luck overtook some of the field stations. 2HL and 2VL started out for Rylston but had to return due to car breakdown. 2ATO and 2AZO were unable to make Barrington. 2ZAR took 2HL's location, making an all night trip on the Saturday night of 160 miles through storms and high winds, only to give the location away with no signals heard and the threat of some snow 2HO at Ebor could not get to his favorite spot on the top due to high winds which may have accounted for some of the stations in the North not hearing him, although 2HO heard 2NY at Grafton 89, but did not contact him.

Stations in the link which was hoped would extend to VK4 were 2OA, 2ANF, 2ALJ, 2AWZ/P Mt. Tomah, 2JX, 2ANU/P Murundi, 2AZO/P Hassans Walls, 2WH, 2ZAR/P Sofala, 2HL/P Razorback, 2LG/P Mt. Gibraltar, 2HO/P Ebor, 2ADT 2AQI. The message to VK4 was passed direct to 2HO/P by 2JX over 383 miles, but Roy 2HO could not pass it any further North. Conditions seemed to be against the operations as 2WH was not heard by any of the stations which had never happened before, however better luck on the next attempt.

The November meeting of the Group will be held on Friday, 4th, at the Petersham Technical College.—2LG.

VICTORIA

The last fox hunt proved a lot of fun for those competing. The fox, 3LN, set off towards the eastern suburbs and for the first location hid in amongst long grass and trees behind a football oval near the Studley Park Reserve. He was able to remain there undiscovered for quite a while watching hound car headlights flashing all around him, but was eventually discovered by Roy 3ARY to make the first catch of the evening. He then made off over the Chandler Highway, but was caught at the outer circle bridge while waiting for the traffic lights to change by Ray 3KD and Norm with his brand new call sign of 3ZBU A little later he was caught on the run in East Kew by Lance 3AHL and Ron 4ZBH on their motor bike. The second hiding spot was in a reserve off Burke Road in East Kew where the first to locate him was 3KD and 3ZBU followed by 3ARY and 3ADU.

The fox then headed off towards Ivanhoe way and apparently led 3ALY, 3ZAY and Ray Price up a blind lane, or from what they told us, up several blind streets. These three competitors got mixed up in the Heidelberg housing estate and just couldn't find their way out of it. After leaving this district the fox turned towards the western suburbs on route to the final location. He travelled at 10 miles per hour the whole way without making any stops and wasn't caught up with till he reached West Northcote where he made a brief stop to call control station and was then pounced on by 3ADU and 3ARY, which proves that the fox on the move is a far more difficult target than when stationary, even when he is only travelling at 10 m.p.h. 3OJ, 3IE, 3YS and 3ALZ all helped from their home locations giving cross bearings and directions to the hounds whenever they were called on. At the final location, which was held at the home of Norm 3ZBU, 23 of the Group had supper together and held a post mortem on the hunt.

The outright winner for the evening was Roy 3ARY, second place went to 3ZBU and 3KD, and third place to 3ADU We wish to thank Mr. and Mrs. Dench for their friendly hospitality in making their home available to the Group to finish off the evening which all voted was a most enjoyable one.

At the v.h.f meeting Fred 3YS displayed and gave a talk on the equipment belonging to Alan 3UI, which was exhibited at the recent All Models Exhibition. It is a particularly nice 2 mx portable station. The rx and tx are on separate chassis, each 13 x 7 in. with 8 in. panels, contains all the facilities of a home station set up with provision for phone and c.w. The rx utilises a cascode 6AK5, 6J6 xtal cont. front end using a 7830 Kc. xtal with a multiplication of 18 times. This feeds into a tunable i.f. and mixer with a range of 6.3 to 10.3 Mc., thence via a standard i.f channel of 1615 Kc. to the audio end. The tx operates with an 8 Mc. xtal osc. on its fundamental frequency with a 6AG7 which triples to 24 Mc, and is capacity coupled to a 6BW6 to 72 Mc. This in turn being capacity coupled to a 5763 doubling to 144 Mc. Link coupling is used to the p.a. tube, a QQE04/20 (the equivalent of an 833). Parallel lines are used for both the grid and plate circuits of the p.a. A pair of 6F6s and an SCR522 modulation transformer provide the modulation. The equipment is powered from a 12v. accumulator and genemotors with an input of approx. 15w to the tx final tube and it performed very successfully on the occasion of the recent VK3 field day and v.h.f. relay when contacts were made to both Melbourne and across to the N.S.W stations.

It was also decided to make a full discussion of field days at the next v.h.f. meeting when it is hoped to introduce some form of a competitive side into the events this year.

Keep a lookout for 3AWC, of Bendigo, who is operating on 144.94 Mc. and is looking for contacts. Roy 3ES has been heard on the 2 mx band several times lately, putting out very excellent signals.—Phyl Moncur.

SOUTH AUSTRALIA

144 Mc.: Last month activity on this band reached a peak with no less than 12 different stations active. The main incentive to all this activity was the appearance of Ern 5EN on 2 mx. Ern is located at Pt. Pirie and his frequency is 144.12 Mc. plus or minus a few Kc. of drift until the rock settles down. Ern has been having many excellent contacts with Reg 5QR who, incidentally, has put in an appearance after about 12 months absence. Reg is well located to work into Pirie and signals both ways average S7-8 with peaks to S9. 5MT is second best in this direction, due of course to an inferior location (must have some excuse Reg). 5EN has also contacted Col 5RO and Clem 5GL on phone.

Another country stalwart is Bob 5RI at Mt. Byron. So far Bob has only worked two or three stations and last month he had his first phone contact with Adelaide, viz., 5MT. Apparently signals over this difficult 100 mile path are at their peak about 10 a.m. in the mornings. Your scribe relays 5WI every Sunday morning on a frequency of 144.63 Mc. with the beam due North, this is a compromise in direction between Pt. Pirie, Gawler and Mt. Bryon.

Speaking of Gawler, reminds me of Les 5AX and Comps 5EF Les is transmitting a nice clean signal on 144.42 Mc., however Comps is still having difficulty in "taming" a pair of 6146s. Heard Comps calling 5RO one night but no contact resulted, your scribe called instead but apparently Comp's rx dial jammed as no answer was received.

Last month Hugh 5BC paid a visit to Adelaide and called in to see the junk at 5MT. We had a good long yarn which was unfortunately cut short by the dinner gong However, Hughie informed me that all his 2 mx gear "is a going concern" and he will be on the air again in about two months when he moves into his new home Another piece of good news from last month is the fact that Ern 5EN actually heard Ken 5KC on 2 mx (good show Ken, keep it up).

Col 5RO paid a visit to Broken Hill last month, also did Ian 5ZAA. Col had some very interesting gossip to tell me about v h f. activity in that area which I understand is almost non-existent, except for the test transmission on 145 Mc. beamed on Adelaide. The set up in use is: 100w. input to push-pull 2E26s (complete with glowing plates), 3 el. beam fed with 100 yards co-ax about 40 ft. high.

Stations active last month were: 5GL, 5AX, 5EF, 5RO, 5QR, 5RI, 5ZAW, 5ZAA, 5EN, 5MT, 5GB and 5KC.—5MT.

WESTERN AUSTRALIA

Don 6ZAV and his wife were the hosts for the October meeting of the V.h.f. Group. About 20 members were present. Welcomed was Ron 6FM after a long absence due to shift work. Frank 6CC was our lecturer and spoke of his experiences with the effect of moisture on receiving. He mentioned its effect on the antenna and feeders and the loss of sensitivity which does result if a rx is not regularly warmed to drive the moisture out.

Amongst items of gear passed around were Don 6HK's miniature converter for 2 mx on a chassis 4 x 3 in. and your scribe's "pot" osc. for 1 mx. The latter was made from two jam tins. Comments that if I could not work anyone with it, I should rattle the two tins together was not appreciated!

80 Mc.: Conditions are improving and the band should open very soon to the East. Signs of the improvement are Don 6HK's contact on 28 Mc. to 4X4 and John 6GU's to VS6 on the same band. Kevin Bicknell reports building a converter but complains that there are no signals to listen to. The introduction of the Limited License has certainly resulted in 6 mx being neglected.

144 Mc.: Ron 6FM is progressing with his phase modulator exciter and hopes to get his 829B going for the summer DX. Don 6ZAK is building up a new tx and plans for a 100w. final. Stan 6ZAS has completed his new rack and his plans for a 866 Mc. xtal tx have collapsed into the form of a car. What about a mobile station Stan instead? Cecil 6ZAZ, after re-building his converter, is commencing a t.v. rx with the idea of checking reception of Melbourne and Sydney National stations. Ralph 6ZAD tells an amusing story of how a photographer close to the new radar weather station lost 40 flash bulbs when the tx was switched on. The 100kw. peak pulse power set them all off!

288 Mc.: Len 6ZAT appeared on the band with a 6J6 mod. osc. and his "twin." Don 6ZAK, followed with a QQC04/15 tripler.

V.h.f. Records.—The following are believed to be the v.h.f. records in the West.—

50 Mc.—VK6HK/VR2CG, 2/1/55, 3026 miles.
144 Mc.—VK6BO/VK5GL, 31/12/51, 1328 miles.
VK6BO/VK5GL, 2/2/52, 1328 miles.
VK6BO/VK5QR, 2/2/52, 1328 miles.
288 Mc.—VK6BO/VK6DW/P, /40, 23 miles.

Any new claims should be forwarded to Stan Stewart, 90 Railway Road, Mt. Lawley.

Finally, remember that Don 6HK, using slow m.c.w., will be pleased to work anyone at 7 p.m. Thursday and Sundays. He will be on 144.28 Mc.—6ZAA.

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HAVE YOU HEARD OF A GIGACYCLE?

How many cycles per second in one Gigacycle?

One Gigacycle per second (Gc.) equals 1000 Mc.

Authority: Journal of the Colombo Institution of Electrical Engineers for February, 1955.

The Widely Acclaimed MULLARD "5-10"

High Quality Low Cost Amplifier Comes to Australia!

The need for a well designed, low cost, high quality amplifier is reflected by the already unprecedented wide acceptance of the Mullard 5-10 amplifier. The popularity of the design, both in England and America, has resulted in the amplifier being now available in many kits forms—even a printed circuit version.

A brief specification of the amplifier is as follows:—

Power Output: Rated output 10W. Max. output 12-13W.

Total Harmonic Distortion. The total harmonic distortion is less than 0.4% at 40 c/s measured for 10W. output with normal loading and sine wave input.

Hum and Noise: —73db relative to 10W

Frequency Response: ±0.5db 10 c/s to 20,000 c/s.

Sensitivity: An input of 50mV to the first valve gives 10W. output. This output power is produced by an input of 600mV to the tone control circuit.

Treble Control: Continuously variable control of treble from +10db to — 0db at 10,000 c/s.

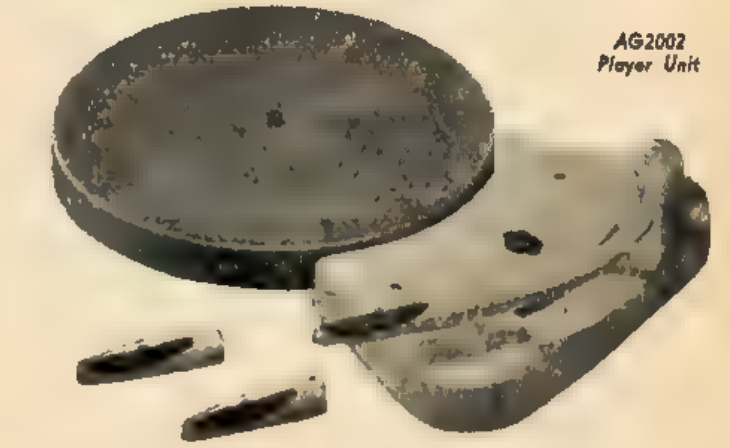
Bass Control: Continuously variable control of bass from +1 db to —5db at 20 c/s.

Companion unit to the Mullard 5-10 amplifier is the AG2002 low cost, 3-speed player unit. This world-wide popular high quality player is now made in Australia and features an extremely low rumble level yet high torque. Standard equipment is a dual stylii head but individual microgroove and 78 r p m. plug-in heads giving an even wider range are available. For the most fastidious, there is a microgroove head with a diamond stylus.

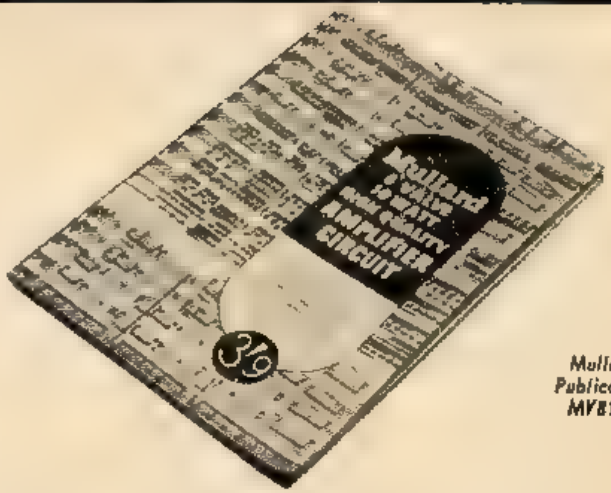
Designed by valve applications engineers for quality performance at low cost, the construction of the amplifier is fully described in Mullard publication MV8104 now available in your State for 3/9 (post-paid, 4/3).* This booklet also contains details of the AG2002 player, equalisation networks and an outstanding horn-type loud speaker enclosure. The latter enables the use of low-cost speakers — surprising performance from the inexpensive, locally made speakers recommended in the Australian section of the booklet

**Mullard does not supply the assembled amplifier or a kitset, but the complete 5-10 amplifier kit including an approved output transformer can be obtained from Electronic Products, Box 28, Post Office, Punchbowl, New South Wales.*

5W./10W. Amplifier



AG2002 Player Unit



Mullard Publication MV8104

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M18a

DX ACTIVITY BY VK3AHH†

PROPAGATION REPORT

3.5 Mc., Again, conditions were quite reliable as far as times of break-throughs were concerned. Signals were best during the following periods: 2000-2100z for **Europe**, and 0730-1200z for **North America**, with the possibility of break-throughs from other parts of the American continents.

7 Mc., The interference from broadcast and other commercial stations in the exclusive Amateur band 7000-7100 Kc. has now reached such a calamitous degree that the all-important Amateur propagation observations are extremely difficult.

Judging by the Amateur activity in the narrow spots between interfering transmissions, this is the report for the month: **Europe** via short route around 1900-2130z, and 0600-0800z over the longth path. **North** and **South America** between 0800z and 1400z, and the **Far East** and the **Pacific Islands** around 0800z and 1400z.

14 Mc.' Conditions were reasonably good and reliable during the month of September. Good openings took place to all continents of the world. Stations in **North America** were present around the clock, while **South American** conditions peaked between 0300 and 0800z. With some occasional break-throughs over the short path, **European** were best over the long path (0500-0900z). Africa could also be worked during that period.

21 Mc.: Here conditions were good to very good when an opening occurred. Normally, conditions followed the pattern typical for this band: The **American continents** around 2300-0400z, with **Europe** between 1900z and 2200z. The **Far East** and the **Pacific Islands** were likely to be workable at any time between 2300z and 1200z.

27 and **28 Mc.**, These bands showed a marked improvement during the month, as was to be expected. Good openings were reported to **North** and **Central America**.

NEWS AND NOTES

Can **you** listen on 7 Mc.? OK, let's have your report on anything you can identify between 7000 and 7100 Kc. Note the time of reception and the call or name of any non-Amateur station operating in that range! **Old-timers and short wave listeners alike, this is a job for all of us! After all, it is our 7 Mc. band!**

It is reported that **ON4QX**, at present in Japan, will soon be active from **AC4 land.** (from N.C.D.X.C.)

According to ZS6AJH, the only **ZS9 station** now active is **ZS9BD** (14 Mc. phone). (from W6YY)

Further details are now available on **ZD9AD**, Gough Island. This is a sub-Antarctic island about 260 miles south-south-east of Tristan da Cunha. The operation is intended to be on all bands with possible emphasis on 21 Mc. c.w. and phone. According to the itinerary, the station should now be in operation and remain active for six months. (from 3YS)

The five stations presently active from Martinique are **FM7WD**, **FM7WF**, **FM7WH**, **FM7WP**, and **FM7WQ**. (from W6YY)

VS2DQ expects to go to **Christmas Island** (ZC3). (from N.C.D.X.C.)

FW8AB, Wallis Is., is still available on 14 Mc. c.w. The best time is apparently between 0430z and 0455z. (from W6YY)

Well known s.w.l. and contributor, Jim Hunt, presently in England, mentions these VK3 signals as being among the best on phone over there: VKs 3AD, 3QK, 3VA, 3XI, 3ZL, 3ACE and 3AHC on 14 Mc. and 3ADP on 21 Mc. (from 3ZBO).

† Hans J. Albrecht, 10 Belgravia Ave., Box Hill North, E.12, Vic.
* Call signs and prefixes worked.
z — zero time—G.M.T.

QTHs OF INTEREST

(from W6YY, N.C.D.X.C., VKs 3PG, 5WO, 7LZ, and Rod de Bulfour)

HK3PC—C/o. Apartado Aereo 3418, Bogota, Colombia.
VP8BD—Via International Short Wave League, London, England.
FB8XX—Via R.E.F.
CR8CSW C/o. Airport, Goa, Portugese India.
FB8BR—Box 730, Tananarive, Madagascar.
ZP5IB—C/o. American Embassy, Asuncion.
ET3LF Box 114, Addis Ababia, Ethiopia.
ZS8L—Via ZS1PD.
SV0WS—A.P.O. 206, New York (W7PXS).
5A1TJ—A.P.O. 231, New York.
HB1KU/HE—Via HK9KU
5A1TL—Box 372, Tripoli, Lybia.
VR3B—Deane Laws, C/o. Cable and Wireless, Fanning Island, via Suva.
Ex-ZC5VR Via VS2EW

ACTIVITIES

3.5 Mc.: John **3ZC** reports Ws. Jack **6EJ** heard **ZS6PM** on phone (August). Eric **BERS 195** adds W7 and **FK8AR/MM**. Dave Jenkin heard W1, W3, W7 and 8. **3AHH** worked W8* and W9*.

7 Mc.: Laurie **2AMB** heads the list with **YV1AD*** and **VS6CG**, **FI8AC**, **VS6CQ**, **ZS5OX** on c.w., and **HP3FL*** and **JA1ALL** on phone. Noel **3ZO** heard HP2, while Frank **3ZU** reports JA1, JA3, JA5, HP3FL, HB1, XE1LN, HC1FS. Kel **3AZP** heard **FM7WQ**. Les **4XJ** spoke to JA1AMZ* and a series of Ws*. Jack **6EJ** worked on c.w. JA5CP*, JA8AE*, VE7KX*, **VP6GT***, **VS2ET***, **ZD6BX***, **ZS5BF***, **ZS5PK***, **ZS5QD***, and on phone **ZS6JM***. Tim **8ZBO** listed JA and KH6. **BERS195** reports **FK8AR/MM** (on phone) and DL4ZC, DU7SV, EA4CS, F8HV, G3OF, I1EC, JA8AE, JA0SS, KH6*, KL7TAG, OH7NF, VE2BN XE1UU, YU3BC, YV1AD (1045z). ZB1CU, SM6ER. Dave Jenkin follows with **HB9NL**, **KP4ABA**, **G3JF**, **F3TJ**, **G6UT**, **PA0KB**, **KZ5YS**, **DL9TJ**, **G6ZO**, **F8QJ**, and **G3DMG**.

14 Mc. c.w. Alan **3CX*** PX1EX*, XW8AB*, HR4AS*, HR4WH*, HK4BD*, KP4*, VP8*, CM8AA*, ZB1BF*, VQ4EO*, HB1KU/HE*, ZS6*, ZS5*, XE1MB*, SU1DD*, XE1OE* VS6*, CN8AP* and EA8BH, AC5PN, ZD2NWW Neil **3HG** VQ8CB* Allan **3HL** Gs*, Jack **3JA**: SM*, F* DL*, Gs*, I1* DU1DO*, VU2MA*, VU2RC* HB9*, ON4*, HH2FL*, HR1AT*, ZS6C* KT1EXO*, VS6*, LA1*, VU2SX*, OH*, FB8*, CR9*, ZS2*, GW*, TF6TP*, AP2Q*, HB1*, Ken **3KR**: HB1OP/HE*, OZ*, Gs*, Fs*, EA*, OE*, PJ2AN*, LA* VR2* VS6*, II9*, XE1MJ*, DJ/DL*, YU*, KG4AV*, SM*, OH*, PY7WO*, 4S7WP* ZS6*, CO2WD*, MP4QAH*, MP4BBL*, ZM6AS*, HZ1HZ* and XW8AB Mart **3MH** KV4AA*, Europeans* Albert 3PG: F*, HB9*, 9S4AX*, Gs*, I* OE*, DJ/DL* ON4*, YU*, EA*, PA*, KV4AA*, ET3LF*, VP8BD*, FB8BR*, VP8BM*, YJ1DL*, HB1KU/HE* Ivor **3XB** PJ2AV*, EA* John 3ZC XE*, DL*, JA* Allan **5AHM** ZC5CT*, PJ2AV*, 9S4AX*, HH2FL*, FA3OA*, YV5BJ* XE1CM*, DU6IV*, CT.*, I1*, G*, OH*, DL*, PA*, HB*, F*, OE*, EA*, OZ*, YU*, SM*, VS6*, KR6*, KA* Bob **4RW**: VO6AE*, KP4TF*, F*, ON4*, YU*, DL*, TI2PZ*, VQ4EO*, FF8AJ*, EA*, HB1PM*, ZE3*, VP3VN*, 4X4IE* PJ2AV*, CT1*, CE3RE* John **5HI**, TI2BC* TI2BZ*, KP4ACB* FO8AL*, IS1FIC*, Austin **5WO** YU*, OH*, DL/DJ*, SM*, SL*, I1*, ON4*, G*, PA*, OE1*, HB9*, KV4AA*, FB8XX*, CR7CI*, ZS6IX*, JAs* Jack **6EJ**: AP2V* DJ/DL*, EA*, F*, Gs*, GW*, HB9*, I1*, JA* KA3OO*, KL7PI*, MP4BBE*, OEs*, OHs*, ON4*, PA0*, SM*, VS1GX* VS2DG*, VS2EK*, VP6BM*, VP9BM* VU2CP*, VU2HF*, VU2NR* YU* Tim **8ZBO** HH2FI, YU, OE, HB9, F, G, GM, YV5BZ. ZS6CY XW8AB, CO2CT, ZB1BF, FK8, KH6, KV4AA. Eric **BERS195**: CE5AW, DL, EI9Y DU1CV, FB8XX, FA8GA, FK8, JA, KC6CG, KJ6, KL7, KP4KD, KR5QW KW6BB KV4BK, LA1 LU2MAC, OE, OH, PY1BFR SM, VS1GX, VS2EP, VS6DG, VQ8CB, VU2HF, XW8AB XZ2AD, 9S4AX Ian WIA-L3007 LU5KA, LU5XA Dave Jenkin VR2BZ, KJ6 DL, VU2MA, KV4AA, YU, XE1QM OZ, F I1, KV4BK JA KP4TF, PJ2AQ YV5BX, OH HH2FL, FK8, HB9, CO2, CT1 DU1AQ **3AHH** OE* G*, YU*, SM*, XE1MJ* I1BCB/Trieste*, DL1DJ*, 9S4AX*, I1*, HB9*, EA* PA* and FW8AB

14 Mc. Phone 3HG: Gs*, ZB1DHF/VS1*, ZC5CT*, GW*, 5A3TZ*, PA*, HK4DP*, CE2DD*, CT1* **3HL**: Gs*, **3JA**: ON4*, FK8AR/MM*, Gs*, GW*, SM*, HB1OP/HE*, CN8MM*, I1*, XZ2SS*, GM* 4S7YL*, VU2RC*, TG2AD*, HC1ES* PY2CK*, PY2AHS*, PY1NC* PY4VX*, PY4ZS*, HK3PC*, HK4DP*, LU4DMG*, LU7AAT*, CX2CO* DL*, PI1J*, F*, EA* LU1FAE*, CX5PV* KJ6* **3KR** OE*, HK3PC*, G* 3PG YN4CB*, HK4DP* Stan **8TE**: CE2DD*, CO2BL* DJ DL* F* FI8AO*, FM7WF*, Gs*, HB1KU/HE* HB9J*, HK3FV*, HP1EH*, HK4DP* I1* KP4ACS* KV4BB*, KZ5CS*, OH* OE*, ON4* OZ* PI1J*, SM*, TI2RMA*, VP9G* VS2CV*, VU2BR* XE2NT*, 5A1TA*, 5A3TZ* Harold **3AHC** KP4ACC, VS2EW*, KR6*, CO1AF*, F*, VQ4EO*, 3A4TX*, I*, ON4*, EA*, SM*, HB9*, CN8FI*, CN8MM*, KL7s*, KA/JA*, DL*, YI2AM* LA*, KZ5CS* KV4BB* HK4DP*, 4X4DK*, GW*, PA0*, CT3AA*, CR9AH*, OH*, VS1EW*, 4S7*, XZ2KN*, PJ2CH*, 9S4AX* GD3ENK*, OZ*, KJ6*, TG9AD*, 4RW OD5AB* 5HI OQ5FH*, ET2US*, KR6*, OE* I1* YU*, F*, G*, SM*, HK3FV*, TG9AD* KZ5CS*, 5A3TZ*, OH*, ZS5MP*, HB1KU/HE* TG9MB*, ON4*, 5WO 5A3TZ*, 5A1TL*, I*, F* HK4DP* KV4BB*, HK5ER*, TI7MH*, DL*, OE*, SM* EA*, HB9*, G* CT1*, CX2AX*, PY2CK*, HK3PC*, TG9AD*, TI2CHV*, LU4DMG*, CX2CO*, PY2AHS*, LU7AAT*, PA0* HI6EC*, CO8DL*, YV5BS*, YI2AM*, EA*, OH* 6EJ AC3SQ*, OH*, KA*, 4S7* David **3ZAT** F, KM6, G, I1, GW, FO, CT1, OH **BERS195**: FO8AM, KA, VS1GT, VS6, 4S7 WIA-L3007 G, CZ5CS (?) TI2ES, HK4DF HK4DP, TI2DLM, OD5AT, YV5AB ZM6AT LU7AAT, PY4VX, LU4CN, KA, CT1, EA8DD, EA7DT, GD3FAC, GW. **Rod de Bulfour** KT1WX, I1, DL, KC6CG, HC2OM, HK3PC, KV4BI, G, CN8MM, KA, KM, JA, KR6, EA KV4BB, OA4AQ, KG1AX, VR2CW, FK8.

21 Mc.' **3JA**' Ws*, KH6*, KG6*, VS6* **3PG**: JA1ANG*, DL6AL*, Ws*, W0RFT MM*, HC1EP*, HC1FS*, YV5ABE*, ZP5IB* Frank **8ZU**, Ws HC, VS6, KR6, KH6, KA, VR2. **3AHC**, W*, CP5EF*, KR6*, HC1EP*, KV4BB*. Len **3ALD** Ws*, and G, DL, KA, JAs, VS6, CR8AH, KR6. **5WO**: G5VT*, W4EWS MM*, CO1* 7LZ: HC1FS*, VP8BD*

27 and **28 Mc.**' 3PG reports Ws around 0000 to 0100z and VK9BW*. **8ZU** heard W6VAD, W5VY. **4XJ** spent some time on these bands with these excellent results: TI3LA*, KH6BQJ*, KH6AGY*, KH6AVH*, KH6BIM*, KH6BAK*, W4NHF*, K4BZJ*, W4PQW*, W4BWP*, W4WSJ*, K4BLM*, W4NJM*, W4WWJ*, W4EKZ*, W4HZG*, W4WAQ*, W4UCY, W4AZO*, W5VY*, W5ITC*, W6MLW*, W6TGM*, W6KJC*, W6ANK*, W6ZHY*, W7RD*, W7TPT*

Rare QSLs were received by **2AMB** VK1DY **3CX** FB8XX, YN1AA, VK1DY **3HG** FB8XX **3JA**, 3KR, 3MH, 3PG, 3TE, 3WQ, 3XB, 3YS, **3KR** VP8AZ, 3V8BB, CX2BP, ZM6AT **3XB**, ZD6BX **5HI**: YV5AO, I1, CR9AH, YV1AA, VK1DY, VK1EG. **BERS195**: ZM6AS (3.5 Mc.).

Thanks to W6YY, the Northern California DX Club, and VKs 2AMB, 3CX, 3HG, 3HL, 3JA, 3KKR, 3MH, 3PG, 3TE, 3WQ, 3XB, 3YS, 3ZC, 3ZO, 3ZU, 3AEP, 3AHC, 3AHM, 3ALD, 4RW, 4XJ, 5HI, 5RK, 5WO, 6EJ, 7LZ 3ZAT, 3ZBO, and BERS195, W1A-L3007, Dave Jenkin (VK3), and Rod de Bulfour (VK7).

D.X.C.C. LISTING

Listed below are the highest twelve members in each section. New members and those whose totals have been amended will also be shown.

PHONE

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK1BZ	3	176	VK3ATN	26	153
VK4HR	12	176	VK4KS	9	152
VK6RU	2	168	VK6KW	4	150
VK4FJ	21	164	VK3LN	11	141
VK3EE	10	163	VK4RW	23	141
VK3JD	1	155	VK3AWW	14	140

C.W.

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK3BZ	5	222	VK3CX	26	175
VK1PH	15	205	VK5BY	45	172
VK4HR	8	200	VK2EO	2	170
VK3KB	10	200	VK6RX	23	159
VK4FJ	29	191	VK6RU	16	158
VK4EL	9	175	VK5BO	33	157

New Members

VK2XU	48	142

Amendments

VK3YL	39	145

OPEN

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK3BZ	4	231	VK2NS	16	195
VK2ACX	6	225	VK3HG	3	181
VK4HR	7	214	VK4EL	10	175
VK4FJ	32	206	VK6KW	13	171
VK6RU	8	203	VK3DI	2	170
VK3JE	12	196	VK4DO	15	168

New Members

VK3XU	61	150	VK4CC	63	117

FEDERAL, QSL, and DIVISIONAL NOTES

FEDERAL

CROSS-BAND BREAK-IN OPERATION

Attention of members is directed to their obligations in regard to break-in and cross-band working.

It should be noted that the operator must cut the carrier during the listening period. This is clearly stated in Paras. 112 and 113 of the P.M.G's. Handbook for Operators of Amateur Wireless Stations.

Apart from the fact that it is contrary to Regulations, an unmodulated carrier on the crowded lower frequency bands can be a matter of considerable inconvenience to fellow Amateurs.

SLOW MORSE

It is pleasing to note that both the VK7 and VK2 Divisions have recommenced their Slow Morse Sessions. This service is one of the most important in our Institute because it is the means of bringing in new licensees, and, as a result, new members.

VK7 Slow Morse is in the capable hands of VK7KA and is heard on the 3.5 Mc. band each Sunday from 0915 to 0945 hours.

The VK2 Sessions will be controlled by VK2AAB. Barry is planning daily sessions on 3.5 Mc. and these should be in full operation when this goes to press.

It is intended to give a complete summary of Slow Morse Sessions, times, and frequencies, every three months in "Amateur Radio" so that members and aspiring A.O.C.P. candidates will know when and where to listen.

INTERNATIONAL CONFERENCE IN REGION 1

Next year (1956), Italy will be the location for the next International conference of the Region 1 I.A.R.U. Societies. This gathering may prove a momentous one, because it will precede the C.C.I.R. technical convention in Warsaw in August, 1956, as well as a possible I.T.U. in Geneva some time later.

In similar vein, Federal Executive is desirous that a Region 3 International Conference of Amateurs should be held when the Olympic Games are taking place in Melbourne during November, 1956.

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FEDERAL AWARDS

Additional W.A.V.K.C.A. Awards have been issued to: Harry Akesson, SM8WI, Alec G. Binnie, ZL1QW; Rudi Hammer, DL1AA, Bert Allen, G8IG; G. A. Massey, G6VQ; G. Bill Wilkinson, W1HA, B. M. Scudmore, G6BS.

—G. Weynton, VK3XU, Awards Manager.

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FED. CONTEST COMMITTEE

After taking into consideration the ideas submitted by last year's contestants, a set of rules was drafted which seemed to be a suitable compromise between them and the directions by Federal Council. In the meantime alterations were made to our bands and your Committee felt that in order to advance we must put forward fresh proposals, even at the late hour, in order to fulfill the obligation to keep all v.h.f. bands fully occupied.

We apologise for the short notice, but ask that you sincerely give these rules a real try out for at least two years. They have been based on the voting received from those Divisions who answered our signal and really gave us something to work on. It is an impossible task to obtain a set of rules which will completely satisfy everybody, because the VK call areas have such different propagation conditions, particularly on the v.h.f. bands.

You will notice that a new award has been created for the holders of L.A.O.C.P. calls and the Committee is hoping for a good entry from this group.

And now good luck to all who enter, let us make this year's Contest a record entry. Your Committee won't even bat an eyelid if 500 logs turn up!

—Chairman, Federal Contest Committee.

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NEW SOUTH WALES

EASTERN SUBURBS

"Ground-plane-itis" has attacked one or two in this area, including 2NO. It is not the first time that Don has used a G-P on 20 mx, but the one he has now is but 8 ft. to earth from the 90 degree radials. In 10 days causual c.w. and phone activity the DX—and on a jam-packed band—has included G, ON, F, PI, OZ, SM, I, SP, LZ1, YU, OK, K6, CT, EA, TG, and others. 2AWE and 2ASS are also getting good results, but 2TH is not sure of his installation yet. Roy says he could strike a 40w. lamp off a clothes line near one of the radials. That certainly looks as if the vertical is not matched in and that the radials are taking all the soup!

2ASE has had a bad time with health, added to which a gale wrecked his 2 mx 3 over 3 whilst he was "laid up." To the rescue came good Samaritans Andy 2AX, Charles 2AWQ and Ken 2SD. These excellent demonstrators of the good old Amateur spirit had a skeleton slot array on Ernest's straightened-out rotary water pipe in quick time. To cap things, Ernest did in his (second) 813 and found that an 832 didn't perform as well with accidental low plate and high screen voltage. With that corrected, all is well again.

High up on the skyline towers the rotary at 2VA, which recently seems to have become a four el. When Vince gets on that bug he literally mows down the DX in fine style during sundry contests. Also, he is often heard on s.s.b. yarning with Ws at the h.f. end of 20 mx. The rotary compressed dipole at 2AIG seems to be getting a nice quota of c.w. DX for Ray. 2AJG has been quite active on 20 mx recently, mainly on the key. This scribe apologises, Laurie, for blocking the rx front end, but that works either way with stations in close proximity! Visitors to 2NO of late have been 3AD (ex-G6TM) and 3ZE—now returned from a sojourn in U.K. Bert 2AGW, also just back from a trip of 35,000 miles by air, came over from his North Shore habitat to tell of doings. He visited Gs, Ws, SMs and others. When a few hours out from Gander, Newfoundland, en route to U.K., a wing leading edge wrinkled, and high octane gas streamed out. That resulted in return to N.F. However, Bert made it to G after a few hours delay. He considers that SM land is the cleanest of all countries he has visited.

Nothing has been heard for ages of 2ZQ; what is doing Fred? Horrie 2FA, long beset by the demon b.c.l., has, thanks to good luck and some unusual "gen," triumphed at last. Anyway, the b.c.l. now has to crawl into the speaker to hear Horrie, which is about what the doctor ordered. Fine business, and lookout DX—here we come! 2NW has been in G land getting the low down on t.v. from all angles, and judging by his communiques he knows what to expect when the balloon goes up in VK. Latest antenna to attract attention is Wal Salmon's "D.E. Lazy H" ("A.R." Oct., '55) and it is thought that as we have the "ZL Special," Wal's effort could aptly be dubbed the "Sugar Apple" Special?

SOUTH WESTERN ZONE CONVENTION

The big news this month of course is of the Third Convention held at Albury on 1st and 2nd October. The attendance exceeded our hopes, by a big margin, which shows our Zone Conventions are getting more popular every year. Thanks are extended to all the visitors who travelled such long distances to help make this Convention the success it was. We do hope to see you all next year at the Fourth Convention, possibly at Griffith. The success of the Convention was due to the organising ability of the Albury chaps and XYLs. Special mention to 2RS and Glenda who proved a very capable secretary.

Saturday was taken up with the arrival of visitors at the Masonic Hall and a tour of the Hume Weir and Albury, even the rain did not dampen the spirits of the gang in the bus. The evening was much enjoyed by all, commencing with Dinner at the Hall. The Convention was then opened by the Mayor of Albury (Ald. C. E. Bunton, O.B.E.) who also welcomed the visitors to Albury. N.S.W. President (Jim Corbin, M.B.E.) responded on behalf of the Institute. A most interesting talk on t.v., t.v.i. and b.c.i. was given by George Glover, 3AG, which was much appreciated by the gathering. The rest of the evening was taken up with items such as musical quiz, pick-a-box, and films, supplied and operated by Alf 2BW.

On Sunday the first item on the programme was the 144 Tx Hunt, won by Geoff 2BQ (Tumut), with Keith 2ZAA a close second, and Ross 2PN, third. The 2WI broadcast was done from Don's (2RS) QTH on 80 and 40 mx and much advice was given to the operators by the assembled gang. After lunch, the folk gathered at the North Albury Hall, where disposals gear was auctioned off by 2AJO and 2BW. The Scramble then took place, the winner being Stuart 2PL with Max 2OT second. While the Scramble was in progress, much amusement was caused with a Blindfold Hunt held in the hall. Afternoon tea was then served and the Convention concluded at Don's (2RS) QTH with films and supper in the evening.

Those present at the Convention included, from **Melbourne**: 3AG, 3DU and XYL, 3OF, 3ALQ, 3ZM, 3AID, 3AAH; **Sydney** 2YC, 2EO, 2ASW, 2AAB, 2YB, 2VC, 2AOU, Mrs. Corbin, Mrs. Cahill, Mrs. Todd, **Bendigo**: 3ACN, **Wollongong** 2DY, XYL and party, **Newcastle** 2OT, **Griffith** 2PL, 2ZBJ, 2ZAZ, 2ACS three Associates, Mrs. Savage, Mrs. Harriman, **Tumut** 2PN and family, 2BQ, 2ZAA and XYL, Dick Lech (Forestry Officer), **Wagga** 2BW, 2AID, 2AAF, Mrs. Moye, Mrs. Mitchell, **Tungamah**, 3WQ and Mrs. Chirnside, **Cobram**: 3AXW, **Albury** 2RS, 2OJ, 2QD, 2EU, 2JA, and XYLs, **Coolamon**: 2AJO.

HUNTER BRANCH FIELD DAY

The Hunter Branch Field Day was held at Blackall's Park on Sunday, 2nd October, with a good attendance of the Hunter Branch gang. Those present were VKs 2CS, 2XT, 2XY, 2AHA, 2AOR, 2ARV, 2FA, 2ANA, 2QB, 2AHT, 2KQ, 2SF, 2RU, and Associates: D. Elsley, R. James, B. Bailey, R. Kidd, Snr., R. Kidd, Jnr., and their XYLs and families. Apologies were received from 2AGD, Gordon Sutherland, and 2KG. During the day the children were supplied with ice creams and soft drinks.

The Hidden Tx Hunt at 10 a.m. was not found in the allotted time, though Bill 2XT was very close, so the prize—a Rebacca Transceiver—will be held over till next year.

The famous Hunter Branch "Blindfold Tx Hunt" was held in the afternoon and was won by Lionel 2CS. The ladies also were contestants in this event and Mrs. Bailey, XYL of Associate Bob Bailey, was the outright winner. So next year, chaps, beware of the XYL!

During the day various other competitions were held and these were won by—Ladies' lucky number: Mrs. Hansen, of 2XY; OMs lucky number: Jim, 2AHT; ladies' nail driving: Joyce, XYL of 2AHA. OMs nail driving: Les 2AOR, identify the bits and pieces: Norm 2ANA and Bill 2XT; estimate the frequency of a xtal: Bill 2XT; estimate the frequency of a tuned circuit: Bob Bailey and Ray James. In the know your voices, the XYLs proved too good for the OMs by winning, Muriel of 2FP and Joyce 2AHA, being the lucky ones. The boys' (3-7) race was won by Jimmy Hall, girls 3-7, by Joyce Archabold; boys 7-12, Barry Rudkin; girls 7-12, by Martyn Whyte. Ladies' race won by Miss Bailey, and the OMs by Keith Rudkin.

It was very pleasing to see Mrs. Rudkin, wife of our late member, and family present.

The function closed at 5.30 p.m. when all the boys raced home to see what was offering in the VK-ZL Contest.

The November meeting of the Hunter Branch will be held at the Technical College, Tighes Hill on Friday, when John Moyle, 2JU, will lecture on amplifiers and various films will be screened.

Arrangements are well in hand for the Hunter Branch Xmas Social to be held on Saturday, 10th December, 1955, when it is hoped to maintain our usual high standard of entertainment, so do not forget to come and meet all your old pals again. 2AWX, the official station of the Hunter Branch of the W.I.A. (N.S.W. Div.), can be heard on 14100 Kc. every Monday night at 2000 hours E.S.T. with the latest doings of the Hunter Branch.

Lionel 2CS is looking for a new anchor. Bill 2XT very busy with converters. Harold 2AHA, Jim 2AHT and Dave 2BZ are all mobile. Nail 2KY and Les 2AOR can still be heard on 14 Mc.; how's the audio stage on the xtal set going, Les? Ernie 2FP still winding new transformers for his rig. Leo 2QB getting among the DX. Ron 2AAI and Merv 2AAM busy with 1 mx gear. John 2XQ is still active on 80 mx. Charlie 2ARV has W.A.S. at last. Bill 2CW busy with tape recorders. George 2AGD putting up a new antenna. Jack 2KQ busy with his bowls activities. Doug 2ADS is still rebuilding his gear.

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VICTORIA

There was a large attendance at the October general meeting to hear the lecture given by Mr Burton, of the Melbourne Technical College, on "Square Wave Testing of Amplifiers." This very interesting lecture was received with great enthusiasm from the members, so interested

were they in fact that not one member dropped off for even a tiny little snooze, but they kept firing Mr Burton with a barrage of questions which he was most willing to answer. The equipment with which he demonstrated his lecture included two c.r.o's. which were the envy of all present. At the conclusion of the lecture, Fred 3YS thanked Mr. Burton for his excellent lecture and members showed their appreciation by a very solid round of applause.

During general business, the President announced that a new Secretary had been appointed to take over Col 3FO's position, as Col, after his marriage, will be moving to the country to try his luck. Cheerio Col, and good luck in your new venture and lots of good wishes are extended to you and Phyllis for a very happily married life together. The new Secretary will be Len Robinson, 3ALD, and we hope you'll enjoy your position Len; it will be a lot of hard work, but we're sure you're the man to do it.

The President welcomed three visitors to the meeting, they were Doug Twigg, 7LJ, ex-3IJ, who is to be the radio supervisor at Macquarie Island in the new team going down to the south and who expects to operate while he is there and will be taking out a call for the trip, also Barry 3ZAG, and Mr. G. W. Searby, who hopes to become an associate member of the Institute shortly. New members to the Institute were welcomed, these included Neil Town (3ANK) as a full member, and the following associates: Messrs. D. Watson, A. Wright, T. Straughair, R. Kidgell, M. McDonald, N. McDougall, E. Bailey and T Phefley.

Certificates to those successful in the National Field Day were presented to John 3ARJ, Hans 3AHH, Alf 3IE and Fred 3YS, also to Eric 3ZL for his success in the Ross A. Hull Memorial Contest.

The lecturer for the next general meeting to be held on 2nd November will be Mr. George Glover, 3AG, whose subject will be "Communication and Ancillory Equipment for Home and Portable Use," together with a practical demonstration of the equipment. December meeting (7th) will be a family night with lots of fun for mum and the kids. Don't forget the Annual Dinner to be held at the Hardware Club on Friday, 4th November. Tickets are obtainable from Max Hull, 3ZS.

Over the last couple of years a small group have been adding variety to the Annual Convention by making it a camping week-end. It is such a saving on hotel expenses when you have a family and can be such a lot of fun with a crowd. Mum and the kids go to the pictures while the OMs have their meeting, then they all join in with the activities on the Sunday. We expect to have about five or six families this year with either caravans, tents or converted trucks. The meals are easy, all you need to bring is breakfast for Sunday morning, the dinner on Saturday night and midday meal on Sunday can be had at the hotel, but don't forget to let Neville 3ACN know what meals you'll be needing and for how many, and also how many seats you need booked at the pictures.

Fred 3YS managed to get brother Jim 3ABA safely married off earlier in the month and Jim and new XYL Vera have been happily honeymooning in the vicinity of VK2's "Our 'Arbour" and "Our Bridge." Well that's another good man gone west, however we're working hard on Vera trying to give her the right idea in regard to this Amateur Radio. Can't seem to get that 3VZ off, he seems to believe in safety in numbers, it's not that he can't bear to be tied down to one girl, he just can't drag himself away from all the others. Max 3BQ is a grandfather again; son John, who has been attending the A.O.C.P class this year, has a brand new daughter

The Bi-monthly Victorian Scramble held on the first Monday in October got away to a good start and was very successful on all bands. Those who were operating in the Scramble found it a most enjoyable change to the normal contests and were very enthusiastic about the whole idea. However, we would appreciate more activity, particularly from the country stations. Between now and the next one, which will be held on 5th December, pass the word around and get it known. Remember the more stations operating, the more interesting it will be for all. The rules for the Scramble appear in the September issue of "Amateur Radio." The results of the October Scramble will be announced later.—Phyl Moncur.

80 METRE TRANSMITTER HUNT

A lovely sunny afternoon brought out a good attendance to the 80 mx Tx Hunt. At the starting point the competitors were a little confused as there appeared to be two signals, one sending "de 3WI" and another, in the place of the long dash on the normal code wheel, was sending "de 3ADU." The 3ADU tx was very much louder than 3WI, but fortunately both appeared to be coming from the same direction so all competitors moved off towards the north-west. On getting in the vicinity of the location, however, they found that the two tx's were situated some mile and a half apart and Eric, listening to the 3WI tx, was hand sending 3ADU from a Type A tx during the time 3WI was off the air. The actual 3WI tx had been concealed in a paddock of thistle bushes at Kellor and a co-ax line led to the top wire of the nearest fence. The winner was 3LN who took an hour and a half to find it, followed nearly an hour later by 3ZAD second and 3OJ third. It was certainly a hard one, but very interesting all the way.

The group, which numbered 34, then squatted down on the grass in a big circle and had afternoon tea together and a chat. These hunts are certainly an excellent way of getting to know the other Amateurs and their families.

How about coming along to the next one which is to be held on Sunday, November 13, commencing at 3.30 p.m. from the plantation

Please Note the New Address of the

INWARDS AND OUTWARDS

VK3 QSL BUREAU

C/o W.I.A. VICTORIA DIVISION, 191 QUEEN ST., MELBOURNE

QSL Cards for VK3 are being handled from the Victorian Division's rooms at the above address.

QSL Bureau Managers and members are requested to forward all future cards and correspondence to VK3 QSL Bureau, C/o. W.I.A. Victorian Division, 191 Queen Street, Melbourne.

in College Crescent at the rear of the University? The December Hunt will be held on 11th of that month. If you are not equipped with 80 mx receiving gear, come along just the same; it's a lot of fun looking on and it's sure to get you enthusiastic about building some gear. We can guarantee the family will enjoy the picnic, there are always lots of other children there. Tx Hunts have been known to completely convert anti-radio XYLs. During the summer months, with the warmer weather and long evenings, the group will be taking along a picnic tea. Hope to see you at the next hunt.

SOUTH WESTERN ZONE

Once again there is not much to report, in fact not as much as last month. I don't know what has gone wrong with this zone, never hear our Secretary on the hook-ups or for that matter none of our committee, so how about showing a little more interest in the zone affairs otherwise we will be a dying race. Heard quite a lot of the boys in the Contest. Bill Wines has been very active on the 20 mx band, having logged DL1UX, DL4UZ, W7AAT, W6VVZ, PY4VX, VEs and many others.

Tuesday night hook-ups are badly represented, in fact haven't heard anyone on it from this zone for a few weeks. I listen to Don 3ALQ most Tuesday nights; glad you had a good time at Albury. Hear Bill 3AKW on fairly regularly. John 3ARJ is building a three stage rig so it looks as though the AT5 will be taking a back seat. Les 3DX is not very active as he sees enough of radio all day; his XYL is sick of the AT5 in the lounge, so best you get it pushing a little r.f. into the stratophere. 3EQ hasn't been very active of late owing to pressure of work in the picture industry, but hopes to be able to devote a little more time to radio shortly.

Haven't heard Gordon 3AGV on lately; how is the Convention arrangements going? I hope you have it well in hand as it is not far off. I was in Ballarat recently and saw Bill 3AMH; he informed me that he was shifting to Bendigo as it was promotion for him with the S.E.C., but said he would be down at Colac in November. He will most likely be at 3AQN's QTH a lot.

NORTH EASTERN ZONE

Doug, well known formerly as 3IJ, of Mangalore, has transferred from his position at Cambridge, Tas., to the Dept. of External Territories and is going to be in the party to do the 1955-56 tour on Macquarie Is. as VK1IJ. Alan 3UI is leading a quiet life; Keith 3JC is busy on his house. Stan 3AGT is in comparative isolation up at Tongala, while Les 3ALE is able to keep in touch with others, like Brian 3ASF, and hear how Bruce 3AGG gets on with the DX after modifying his rx; Ted 3AOB is converting a Command rx. Peter 3APF limits his activity to local v.h.f. skeds, while Alex 3AT is playing with colour photography, and Secretary Earle Scoones plays with his motor cycle.

Jan, our local former PA0, has a good rx in action, as a step in the right direction. We regret losing John 3ZBG, from Numurkah. Vern 3AXW has his troubles with b.c.l., while Col 3WQ has overcome similar types with wave traps, etc. There are two Associate membership "prospects" in Cobram at the moment. Syd 3CI is ready for 20 mx now with a W8JK beam; Frank 3ZU will be away on leave, caravaning, shortly, and Jack 3AKC should have just finished his leave. Des 3BP has been heard working ZL on 20 mx.

Bill 3AWQ has obtained some Command equipment from Jim 3JK, prior to getting on the air. Des 3CO and Ken 3KR among the 20 mx DX. Jack 3PF handicapped out of radio by difficult circumstances "pro tem." Vic 3ABX has been seen in the distance. It is hoped that George 3QD is getting a go at the 15 and 20 mx DX, that is where Hugh 3AHF fills in his time. Bill 3JP is all for this DX business now. It is hoped that Keith Cakebread is able to complete his A.O.C.P. by passing the Morse.

EASTERN ZONE

Most important news is the formation of the Latrobe Valley Radio and T.V. Society. Members of the East Gippsland Radio Society went to a meeting convened at Morwell on 16/9/55, where 29 enthusiasts were present. The Zone President, Bert Budge, took the chair and it was decided to form the aforementioned society. Jack Sparks was elected President and Jim Quig Secretary, Ian Dunecliffe Vice-President. A simple objective was resolved: "To further the interests of the W.I.A. in the Latrobe Valley."

Meetings will be at 8 p.m. on the second Friday starting with Moe in October and as decided thereafter. Membership is open to anyone who is interested.

The E.G.R.S. will have a technical film night at Doug. Anderson's home in Stratford on third Friday.

Jim Quig, of Morwell, has passed the Limited exam. and he has built an f.b. t.v. rx which is anxiously awaiting a signal. Ted 3ALA has a junior op., son, now and Alf Mackrell has another. 3SS and 3DY had a working bee two Sundays previous, when 3AHK, 3IO, 3AJA and Doug Anderson came over and helped push up a heavy windmill tower which some day will support a 144 Mc. beam.

Our zone hook-ups on 3650 Kc. at 2000 hours on Sunday are still popular, but we do miss our old friends. What about a brief appearance, boys?

CENTRAL WESTERN ZONE

Our Convention was held in Nhill on Sunday, 18th Sept. We were lucky in picking a nice sunny day and all functions were arranged by Herb 3NR and we owe him a lot of thanks for the way everything worked out.

First the 2 mx boys assembled their gear and had contacts with Clive 3ACE in Birchip. After an excellent lunch, we paid a visit to the Aerodrome and were shown over their equipment which included D.M.E., etc. We must thank the staff for going to so much trouble for us.

At the annual meeting the following officers were elected for the coming year: President, James Farrer, 3DP; Vice-President, Herb Brown, 3NN; Sec. and Treas., W. J. Kinsella, 3AKW. There was not very much business brought forward so the meeting soon finished and we again journeyed out to the 2 mx location and enjoyed more contacts.

Trev's (3ATR) and Ray's (3ATN) gear looked and worked extra well. Herb also had mobile gear and his junior op, Gerry, is very keen on Amateur Radio. The gear which he has already built is a credit to him.

We had another meal and then were shown over the Nhill Power House by Alf 3CH. Some of us had to leave early, but most members were able to stay until the end, after a very enjoyable day.

Those present were VKs 3ATR, 3AKW, 3IB, 3NN, 3ARM, 3ATS, 3CH, 3EF, 3AFO, 3AKP, 3ATN, Jeff Oates, Lyle Schultz, Jack Pulman, Garry Brown, and David Goldsworthy.

PHONE NUMBER CHANGED

The telephone number of the W.I.A. Victorian Division has been changed to:

MY 1087

GEELONG AMATEUR RADIO CLUB

The 2 mx enthusiasts of Geelong were given the secrets of crystal control converters by Ed 3AKE at a recent tightly-packed club evening. Ed's success on 2 mx over many years, and the clear elucidation of many aspects of v.h.f. activity generally, will mean future impetus on this band by local members.

During Hobby Week in the metropolis, the boys took the opportunity of visiting the W.I.A. stand and enjoying a rag-chew with the city boys. A further highlight of the club's activities was a second talk by John 3SY on t.v. rx's and their design. John is well up to date with modern techniques in this field and is passing on his experience among the boys.

Jim 3ZBR is experimenting with a new converter and tx from his QTH near the Yu Yangs. Melbourne stations please note. Fred 3ALG has a new secondary standard—a 100 Kc. osc.—needs a 10 Kc. multivibrator to match it. Chas. 3XH is baiching and manages to pound the ether. The other stalwarts 3BU, 3WT, 3AET, 3ALP are on at regular intervals.

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QUEENSLAND

TOWNSVILLE AREA

Sorry boys that the notes did not appear in October—on eight weeks' leave. Opportunity was taken to visit the Exhibition in Brisbane during August and a few of the local boys were met during the visit. Unfortunately the monthly meeting was being held two days after I left, so unable to meet many others. Quite refreshing to see notes appearing from other parts of Queensland; keep them coming in, then we all know what is happening in each district.

Two meetings have been held of the T.A.R.C. since the last notes and attendance not quite as good as expected. Glad to report that at long last a student course for the A.O.C.P. has started with seven members and hope they will last the distance.

Next meeting will be held on 17th November when the lecture will be on Frequency Measuring by local R.I. The December meeting on 15th will be a visit to the Regional Electricity; 4RU will be conductor.

During the latter part of August the air was disturbed by a strong signal on 7073 Kc. from 4DK located at Ayr. Welcome to the bands John and may your signal never grow weaker; try the other bands some time. Quite a large round table on 7 Mc. each Sunday, the boys from Atherton, Mareeba, Cairns, Townsville, Charters Towers, Ayr, Sarinee, and Rockhampton being to the forefront.

4EL and 4BE chasing the openings on 21 Mc., while 4LR, 4JH, 4RW and 4WH are on 7 and 14 Mc. 4EJ on 14 Mc. with his new shortened beam. Lance 3ZA looked in on 4EJ and 4WH; you forgot me Lance. Our old friend and ex-Secretary of the T.A.R.C., Ken Nutt (ex-4XD), passed through our fair city en route from Tasmania to Cairns to take charge of the local "B" class station; welcome back Ken.—4RW.

MARYBOROUGH

4CB and 4AI thinking of getting back on 6 mx. 4BG is already there, looking for the first break-through. 4CB bought length of co-ax for his future 20 mx beam. I am not to mention that it was expensive in case his XYL reads these notes. What a pal! 4BG waiting for co-ax line and standing wave indicator for his 20 mx beam. 4GH improved the layout of his shack and can now walk into it. Contemplates further improvements that will permit him to turn around. 4AI off to Sydney for u.h.f. course; lucky lad!—4BG.

SOUTH AUSTRALIA

Well, long suffering Amateurs, the hot potato seems to be back in the President's lap, so, as the Christian remarked to the lion, "If we have to have dinner, Les, let's enjoy it together!" Jack 5JD, Federal Councillor and erstwhile scribe, quickly decided to take a trip via oil tanker to Singapore. Once a sailor always a sailor they say, Jack. Anyhow we hope that it is worthwhile, and that you will return to us ready to spar again with your traditional foe, 5PS. Frankly, I reckon that you weren't game to face me after I had put Pincott wise to you both when I conjoined with him in Melbourne.

And whilst on that subject, my thanks to Federal Executive for the time and good hearing that they gave to me and my cause; Gordon Dennis, the VK3 President, and all the members of the Magazine Committee for their wonderful hospitality. It was good to meet you all chaps—for the lamb to lie down with the lions and partake of their largesse. The visit to the Victorian Division's display at the Models Exhibition came as a climax and I would like to congratulate those who were responsible for such an excellent set up. This opinion may be biassed, but I did not have eyes for any other and even my XYL was visibly impressed! After that little homily, when are you going to invite me into the chair Gordon? I'd dearly love to spike Warwick's guns.

By the way, the residence of 5PS had its lid lifted during the Saturday afternoon's meteorological disturbance. We saw him soon afterwards and he remarked that he must be getting old because he didn't have enough heart even to gather up the pieces for his new chicken house! Our sympathies to Mrs. 5PS—don't let it spoil those banana cakes, Audrey.

The general meeting last month was well attended (to welcome back the President, no doubt) and a selection of general and technical films were shown. Taken on spec., they turned out to be quite an interesting evening's entertainment. Our worthy QSL officer was absent and Dougall 5BY and Norm did the honours.

The R.D. Contest was well fielded and our top six scorers really made the pace hot this year. Very fine effort chaps, and this Division's grateful thanks to those who sent in their logs—some 87 of them—to back up the finest effort that VK5 has ever made.

"The time has come," the Walrus said, "to speak of many things," and that reminds me that Council will soon be looking around for some lecturers for 1956-57. Anyone that can supply technical lecturers or who has contacts and ideas please pass them on to yours truly. Don't wait until June, 1956, because the programme has to be printed by 1st March. It's about time somebody came forth with a transistor 144 Mc. tx and rx. What about you Ian?

The Classes seem to be proceeding according to plan and we are very grateful to those who have come to the aid of Council in supplying morse instructors. Carl, who is out of hospital and looking well again is keeping a fatherly eye on the "students" and steps in when a defaulter (me again) fails to punch the key. By the time you reach 14 w.p.m. chaps, you will have copied (?) the fists of 5MD, 5JD, 5OR, 5RG, 5FO and last, but not least, 5XU (no comment from 5CA, please).

The Sunday morning broadcasts were taken by John 5KX, our Vice-President and to him I tender my thanks. These broadcasts give me a great deal of pleasure, especially the contacts afterwards with the chaps, however short they may be. So don't be backward in popping up onto the band. 5WI is usually on ten minutes or so before-hand too.

George 5EC, at Ceduna, is doing a fine job in the Bush Church Medical Aid Service, looking after the communications side of the business. He hopes to be down to collect a new ambulance in October so we may see something of him; has even made A.B.C. News for his work on transceivers for the fishing fleets. Good going, George.

Called into Renmark on the way home and had a yarn with Hobby 5RE, who was up to his armpits in concrete at the time. Fred 5MA was absent from work; reason I discovered when he appeared at the meeting. Roy 5DA and Bob 5BG both at the same meeting—presumably the lightning had scared both out of 5PI. Hughie 5BC was also on leave from 5RM, but I had a yarn with Harry 5KW and he let me into the secret behind the door Hughie. It all looks very nice to me, but of course is unmentionable (a 2 mx tx) in these notes.

Jim 2BO (ex-5EL) sends his regards to the VK5s from Goulburn and looks for contacts in his home State. A very cold impolite wind blew clean through us all, but Jim and his XYL thawed us out with a grand log fire and a brew of tea.

EYRE'S PENINSULAR

Wally 5DF, from Pt. Lincoln, reports that he is back on the air again with the stalwart AT5; it certainly sounds f.b. Associate Alf Mack graced the meeting place and reports are that he is studying hard for the A.O.C.P. Pat 5LT is working on his 20 mx rotary beam. Very little heard of Jack 5VJ these days; comes on for a rag-chew now and then and declares he's not pining away. Apparently Wally has better grape-vines than the Adelaide Plains for he reports that Darce 5RJ in Kadina is about to have 50 cycle power connected. Hope to work you soon Darce. Perhaps Les 5UX will shift and rejoin you all.

SOUTH EAST AREAS

The monthly meeting was postponed and so misses these notes. Activity, like the weather, seems to be at an all time low, although Les 5ZAG has been doing well on 2 mx. Ray 2ATN, complete with mobile gear, was in the Mount on 25th Sept. and from Les' QTH established a two-way QSO with Bram 5ZAB. Later Bram copied Les 5 and 7 with Ray's signal also audible and coming from a halo antenna in his car. Claude 5CH has been heard on 40 mx with a new rig, but there are no details. Sorry I missed you Claude, but since Mohammed came to the mount and missed out, it looks as though the mount will have to come to Mohommed next time doesn't it? Have you ever used that one, Warwick? Col 5CJ is on holidays. (All the b.c. station engineers seem to be on holidays—how do they manage to keep going? Ah! I've got it, they're all going automatic.)

Erg 5KU is still battling with storm damage, but we understand he should be soon on 20 mx complete with beam. 20 mx quite good earlier this month and seems to be improving. Tom 5TW has been settling into his new QTH, but still manages QSOs on Monday nights. Stuart 5MS has spent a little time fitting a VR150 to his v.f.o. and by the time this is printed will have left his mark on the VK-ZL Contest, no doubt. The beam still needs adjustments, though. A visit from Jack 4SF and XYL during September brought forth a lively discussion on DX and antennae. Those are the things that stick out from a butterfly's head, aren't they Stuart? Better antennae and receivers should bring their reward to the 2 mx gang also.

Worked Jack 3JA from Hynam, with the result that Jack and XYL introduced us to Nullawarre's fine brand of scones and cream. Jack's hospitality was typical of all the Amateurs that I had the privilege to meet and it left me feeling that this grand hobby of ours has something else far more valuable than just the DX or the experimental aspect. The bond of real friendship that exists in Ham-down would solve all the International problems if only it could be extended into the realm of power politics.

And one final word—if the compilation officer blue pencils any of this, then I'll red pencil his "A.R's." and even might go so far as his p's and q's also!

Is it that the VK5 boys are getting old, do they like giving things away, or are they only interested in the tintinnabulation of wedding bells? According to our spy (unpaid) in VK5 land, Old Joe 5JO is doing a double act, Joyce was given away on 15th October, and is backing up for a second helping when he gives Joan away on 24th December. Not to be out done, Frank 5MZ is taking the long walk with his daughter Barbara on 5th November. Are the respective grooms members of the W.I.A.? If not, 5PS will please follow up.—Editor.

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TASMANIA

This month the libel suits and various summonses should be addressed to 7LE as the culprit for this month's notes. Tiny 7JD, the usual scribe, is rather snowed under with circumstances this time and isn't able to compile the gossip.

At the general meeting held in the club rooms on 5th October a roll up of 23 members attended. Snowy 7CH was in the chair in the absence of the President, and Bill Tait carried out his usual secretarial duties. The chairman welcomed Bob Forster to the meeting; Bob is an ex-VK3 and is at present at Cambridge Aerodrome. Business for the evening was mainly taken up by Federal matters, the main item being that F.E. requires a survey to be made of the coverage over the State of the slow morse transmissions on 80 mx. 7KA is running the present slow morse transmissions and he would greatly appreciate reports from any listeners. It was decided to hold the first tx hunt of the season on Sunday, 6th Nov., the tx to be on 144 Mc. only and to be hidden by 7AL. In reply to my complaint that my v.h.f. gear was getting very warm through use on field days, I received scant sympathy and the offer of a tin of grease for the genemotor—or was it for something else?

Tom 7FM suggested that a field day be held on the lower frequencies to foster the building of equipment suitable for emergency working and after much discussion the matter was left for investigation in the hands of 7AL and 7FM. The matter of commercial stations in the Amateur bands was raised and discussed and members were requested to log those that can be identified for forwarding on to F.E.

At the conclusion of the business section of the meeting a lecture was given by Joe 7BJ entitled "Crystal Converters for the Low Frequency Bands." As usual Joe had his subject at his finger tips and presented a theoretical method of covering all bands from 80 mx to 10 mx by using only three crystals. A vote of thanks proposed by Athol 7AJ concluded what was to me a most informative and interesting lecture. But will it work Joe?

Main event of this month is the arrival of the stork at the 7DH residence with a double bundle—yes twins—push-pull or parallel Dave? The old wireless bird was also busy at Queenstown last month with a surprise for 7LS—I forget which it is now, but it's either a boy or a girl! 7BR busy again too, re-building the rig I mean. 7ML getting lower in frequency and now in the audio range at the best broadcasting station in Australia (VK5 please note).

Many sore feet, aching backs and sweaty brows marked the conclusion of the recent rescue exercise held in conjunction with the Walking Club and Police. Doug 7AB had quite an experience when a light plane assisting the exercise crashed within a 100 yards of him. I understand that Doug's condition had found him out by the time he reached the wreck, or was it the result of the loss of the end of a finger on the terminal of the h.t. transformer? Anyway, Doug nearly threw a seven both times, but third time lucky. Insurance paid up Doug?

Associate Geoff Foster thinking hard about sitting for the ticket; come on, take the plunge Geoff, and you too Vance, what about that ticket. 7AJ has now finished the mobile 2 mx rig with a halo on the back bumper bar—silver plated, too. Athol found out that it's not a good idea to poke at the innards of a genemotor with a screw driver while it's going. 7WN interested in hi-fi and building a vented enclosure. 7DH and 7MH in a huddle with s.s.b. with something liable to pop up at any moment. Barney Watson learnt the hard way that you must tune the grid coil of a rx osc. and not the feedback winding if best results are required. I believe about four hours of frustration took place before the house fell!

NORTH WESTERN ZONE

News from this area did not appear in last month's edition; this was because the writer had got a few dates a bit mixed up and when he got them straightened out it was realised that there was insufficient time for the notes to reach Melbourne in time for publication.

R.D. Contest has been and gone once more and this area was quite active. Ken 7AI made over 200 contacts and managed to milk a few cows in between times. Others putting up a pretty good score were Roy 7RN and Sam 7UW. Sid 7SF and Ellis 7WA were very busy also although their time was limited, having had other business to claim their attention.

Ellis 7WA has been busy this last month or so building himself a new tx—a real posh job; although not yet completed, Ellis has been heard working Europe using only his driver stage as the final amplifier. Sam 7UW has been going ahead with the erection of his 3 el. beam for 20 mx and hopes to have it working in a few weeks' time.—7UW.

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CORRESPONDENCE

The opinions expressed in these letters are the individual opinions of the writer, and do not necessarily coincide with those of the publishers.

LIMITED LICENSE

Editor "A.R.," Dear Sir,

For several reasons I did not receive my copy of Sept. "A.R." until recently, otherwise I would have tried ere this to bring peace and quiet to VK3BG. To put some of BG's statements back on the rails before burying the subject, may I say there is no "literary battle." Six letters in three months is not even a skirmish! There is no "dirty washing." Surely in agreeing with the remarks of VK3XU and VK3ZAQ, only in so far as they concerned the L.L's., and in stating VK6 is not disloyal and why, is not dirty washing.

There was no "subtle reference" that my colleagues and I were "doing something for the electronic art" on the v.h.f. (I stated I had never been above 144 Mc.). Nor was there any "inference" about the "epitome of Amateur Radio." Everyone knows that for many years the Ham has taken his lead from the laboratories, etc., but the Ham who takes the latest v.h.f. knowledge, and experiments with Ham gear, is, as I said, "breaking new Ham ground on the v.h.f. with equipment the average Ham can afford."

Had VK3BG taken my remarks on their face value, he would have saved himself a lot of beautiful words. And there is no need to worry about the "cancerous growth," because we have found the East has not got a monopoly of wise men.

The L.L. subject has been discussed, etc., here and put into cold storage. Let's leave it there. Anyway, 73 VK3BG.

—J. C. Hoar, VK6OR.

[Correspondence on this matter is now closed.—Editor.]

HAMADS

1/- per line, minimum 3/-.

Advertisements under this heading will only be accepted from Institute Members who desire to dispose of equipment which is their own personal property. Copy must be received by 8th of the month, and remittance must accompany advertisement. Calculation of cost is based on an average of six words a line. Dealers' advertisements not accepted in this column.

FOR SALE: AR7 Receiver, complete with power supply, five coils, £35. Alternator 230v. 500w. Transceiver 1196A, converted, needs xtal only. Best offer. Wanted: three Link type 6 foot cabinets, also A.W.A. Class "C" Wavemeter, type R7647. B. Jellett, Hynam, S.A.

FOR SALE: Oscilloscope, R.A.A.F. type M/D32, complete with all tubes and separate power supply. All unmodified and as received from disposals, £15 packed for rail. J. E. Rogers, 61 Broadway, Yallourn, Vic.

FOR SALE: 5 new 826 tubes, £1 each. Wanted: Prop. Pitch Motor. B. Glassop, 343 Kissing Point Road, Dundas, Sydney.

SELL: Trimax TA908 100w. Modulation Transformer, as new, £6/10/-. Len Johnson, WF 2754 (Vic.).

WANTED: Coil Box C for AR7. D. Jackson, C/o. D.C.A. Mess, Box 370, Darwin, N.T.

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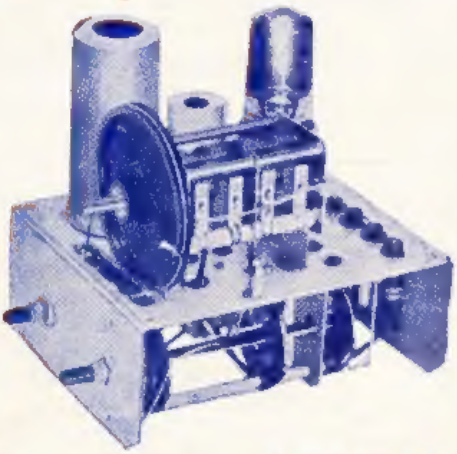

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Each component is fully guaranteed against defective workmanship and faulty material.

STUDY THESE OFFERS:

Transmitter V.F.O. Unit:

Type M4/101: A very stable five-band three-tube V.F.O. unit, fully wired and tested.
Bands: 3.5—4, 7—7.45, 14—14.4, 21—21.6, 28—29.8 Megacycles.
Dial: Fully calibrated and band spread over 180 degrees.
Tubes: 6J5 oscillator, 6AU6 isolator, 6V6 output (not supplied).
Output: Tuned on each band, giving at least 3.5 Ma. grid current to a single 807 on all bands.
Power Supplies (not supplied with unit): 400 volts at 32-54 Ma.
Price (including Sales Tax):
£10/4/9

Crystal Microphones:

Type M/400 Piezoelectric Microphone: A very attractive chrome plated "ball" type microphone of small physical size, complete with three yards of twin shielded low loss cable. Thoroughly shielded.
List Price: £5/19/11

Type T/30: Hand Microphone in well proportioned brown bakelite case. Unite stands on table without need for any stand. Uses UN10 fully screened insert. Complete with 4 ft. of twin screened low loss cable.
List Price: £3/12/-

Crystal Inserts

Type M409: Frequency response 40 — 7,000 cycles. Extremely robust and mechanically strong. Can withstand falls and knocks. No further casing is required as unit is complete as a microphone of attractive appearance.
List Price: 32/11

Type M410: Same unit as M409, but with extra screening to exclude R.F. pick up.
List Price: 38/6

Crystal Insert:

Type UN10: A complete crystal insert for incorporation in a cage in the manufacture of complete microphones. Used in microphones employed with Geloso wire recorders.
List Price: 30/7.

Full information from the Sole Australian Factory Representatives:

R. H. CUNNINGHAM PTY. LTD.
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and 184 VICTORIA ROAD, DRUMMOYNE, N.S.W.